The PABCO HOME BUILDER'S HANDBOOK

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THE

PABCO

HOME BUILDER'S HANDBOOK

Published by

THE PARAFFINE COMPANIES, INC.

SAN FRANCISCO

DEDICATED TO

BETTER HOME CONSTRUCTION
IN THE WEST

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INTRODUCTION

THE keen joyous thrill of building or buying one's own home! What is there in life to compare with it? Home-ownership is a stabilizer, and an indication of thrift and of consideration for one's family and future. A well-built, attractive home, whether it be large or small, furnishes constant enjoyment and inspiration to its owners.

To assist the man who has not yet built or acquired his own home by pointing out certain vital and too often neglected factors of home ownership and construction; to show him how to obtain a beautiful home that the years will treat kindly—enhancing its value—with permanency and low upkeep added to the many other satisfactions of actually possessing his own place of abode—that is the purpose of this booklet.

Rather than attempt to cover the building of a home exhaustively, we have treated of certain important phases with special reference to "danger points" and how they may be avoided, in this way increasing the satisfaction and comfort of ownership, enhancing value and permanency, and lowering upkeep costs.

Most municipalities have definite building regulations covering building construction. It is highly important that all requirements of local building codes and state building laws be complied with. This booklet supplements these provisions and requirements with special information on many points.

Still further, to assure oneself of future peace of mind, one should always consult a qualified expert on each step of building—commencing with a competent real estate man, a lawyer or other established agency in the matter of titles, restrictions, documents, title insurance and so on; an architect, dependable contractors, engineers and specialists in the various phases of construction.

During our forty-six years in the manufacture of good materials for good buildings, we have frequently dreamed of an ultimate ideal, the "guaranteed" house. That ideal is still impractical, impossible, but it can be approached through use of construction methods that measure up to Pabco Standards.

The Pabco Protected House is a term evolved to indicate a home that is built, in so far as possible, in accordance with the methods and materials suggested in the following pages. If all the materials and workmanship in your house are of a grade that is the best in their class —whether or not they utilize Pabco Products—then you have a home that is of the type of a Pabco Protected House.

The term Pabco Protected House means protection not only through use of materials carrying the Pabco trade-mark, but is also a specific term for a standard of excellence that protects the home owner against the shortcomings of ordinary and inferior building.

The PABCO Home Builder's Handbook

CHAPTER I

The Danger Spots

WHAT a world of difference lies between the well constructed house and one built by short-cut methods!

After a year or two of occupancy the true character of the cheaply and hastily built house begins to reveal itself. A summer of sun—the beggar's coat of skimped paint becomes a scaly eyesore. A winter's rain—the basement becomes a pond—the roof a sieve. When the green, unseasoned lumber used in floor joists and studding begins to shrink, plaster cracks are inevitable. The floors bulge or squeak; the rooms are draught-swept. Of course, not all these defects develop in every cheaply constructed house; but an extensive and careful investigation showed that these conditions have been uncomfortably general. As a result a nation-wide resentment has arisen against the "jerry-built" house.

What One Thousand Home Owners Said

To supplement our knowledge, The Paraffine Companies, Inc., sent representatives to call on one thousand home owners. These owners were asked what defects had developed—what details had been overlooked in the homes they occupied—and what they would include in their plans if they were to buy or build a second time.

This investigation demonstrated plainly the need for an *ideal* in home building, and a clearer understanding of *sound construction practice* on the part of home owners.

Individuals differ so widely in their tastes that no attempt was made to determine what arrangement of rooms or general method of construction was most pleasing—but when the matter of *defects* was discussed a single-minded attitude was met. The things that home owners *do not like* were sharply defined. The worst complaints were made about the hidden defects of building—defects that are familiar to every architect and contractor—but not well understood by owners.

Of those interviewed, 70.4 per cent said they had bought ready-built homes, and 29.6 per cent said they had built their own.

Six "Danger Spots" of Home Construction

1. *Roofs* — 72.3 per cent reported damage from leaky roofs.
2. *Insulation, Heating*—52.2 per cent said that their homes were excessively warm in summer and damp and cold in winter.
3. *Sound-Deadening Floors and Walls*—26.3 per cent experienced annoyance because of noises between floors or rooms — sound deadening had not been accomplished.
4. *Studding and Laths*—81.2 per cent of the homes visited reported that serious plaster cracks had developed.
5. *Exterior Paint* — 21.5 per cent of the owners interviewed were dissatisfied with the quality and application of the paint used.
6. *Waterproofing and Dampproofing Basement Walls* —48.8 per cent had basements that were damp enough to cause inconvenience and discomfort to the owners, as well as actual damage to goods stored in the basement.

Here, then, are "danger spots"; not all of them, indeed only a few of the hidden places in home construction that cause dissatisfaction and bring about large expenditures for repairs. These are the details of construction that every prospective buyer or builder should thoroughly understand, and that should be given particular attention by the architect and contractor if low upkeep, permanency of investment and lasting satisfaction are to be provided for the future owner.

Since few families build more than one home, few can depend upon experience for instruction. But now it is not necessary to make the old mistakes. When your architect tells you that your new home is designed to include all possible Pabco Protected House specifications — when a building contractor tells you the house he wishes to sell you is a Pabco Protected House — you can be sure that wise provisions have been made against the common defects of poor construction which otherwise might develop in your home a year or two after you have moved happily into it.

CHAPTER II

Choosing a Building Lot

COMPLETE and lasting satisfaction for the home builder begins with the selection of a lot, and is possible only if the site selected meets most of his requirements, both at present and for the future. The man who is in the market for a building lot usually has a wide range of choice open to him, but certain primary requisites should be given careful consideration before the lot is definitely selected. A decision based upon the advice of the first real estate dealer interviewed is not usually as satisfactory as a choice representing a composite of opinions. So shop around. Talk with your prospective neighbors. Deliberate.

Location

Most home builders are more nearly satisfied when they buy in a built-up district. Here the character of the neighborhood has been definitely established. On the other hand, land values and taxes are usually higher in a neighborhood built up with good types of homes and having desirable residents. This money difference is to be balanced against the measure of uncertainty as to the future development and character of a new tract. Fortunately, definite building restrictions are now frequently incorporated in the deeds of property in new tracts; these restrictions give considerable assurance that the desirable character of the neighborhood will not be disturbed for a period of years—the operation of the restrictions over a period of not less than twenty-five years is probably to be recommended.

The amount that will be expended for the home should constantly be borne in mind while considering property, since obviously it is bad judgment to buy in a district made up of five-thousand-dollar residences if you intend to build a ten-thousand-dollar home. On the other hand, it is wise to avoid a neighborhood in which one might be tempted to live beyond his income to "keep up with the Joneses."

Physical Characteristics

Consider the slope, or grade, of the property and have an eye to the exposure and drainage of the lot you contemplate buying. A variety of soils can be found in almost all localities and the kind of soil selected will have a bearing on construction costs if your future home is to have an excavated basement. For instance, it is far more costly to excavate a basement on a lot in which rock lies close to the surface than would be the case if the basement could be dug in earth.

Exposure

So far as exposure is concerned, here you must begin to sketch out in your mind, if not on paper, how you will have your house arranged — which rooms shall be sunny, which on the shaded side. We cannot pretend to advise you as to this—your own choice must govern; still it may be that you can make a positive gain by sacrificing the sun in a certain room, placing that room in another location where there will be a better view from the windows. Probably it is best not to approach the subject with a rigidly preconceived idea of your house plan. Adapt the plan to the lot—in a measure. But do not sacrifice to the lot all your good ideas of arrangement collected during years of observation; unless it is an exceptional lot you will not easily forget all the desirable features you gave up for it. If the lot will not match up fairly well with your idea of the house, look elsewhere for a more suitable lot.

Landscape

If there is to be even a scrap of a yard, consider soil—that is if you have even the faintest trace of love for either flowers or plants. Even though the kitchen garden is seldom practical, a fruit tree or so, or at least berries, may be planted. If the soil is good a little attention will give you the satisfaction of picking your own fruits or berries—even if the agricultural venture doesn't exactly pay. It may be that you do not care for plants—you may want only a minimum of flowers with formal grass beds at the front of the house, with a hired gardener to care for these at intervals. In such an event a small yard space will answer. In a small yard, soil may be brought in by truck if the original soil is shallow or of poor quality. But at least buy the type of a lot best adapted to your taste for flowers and plants.

Possibilities for Increase of Value

The size of a lot is of considerable moment when increase of value is considered, since the increase in valuation is generally attached to the lot rather than the house. Thus if the lot costs $2000 and the house $9000, at the end of fifteen years the lot may be worth $5000 and the house, if well built and maintained, about $8000, or an increase of $2000 in the property in fifteen years. But if a larger lot has been bought, say costing $4000, and a house costing only $8000 had been built, at the end of fifteen years the lot might be worth $10,000 and the house $7000 or an increase of $5000 with a first investment of only $1000 more than in the other instance. At the same time the owner has had the use of more land, and may ultimately build another house on half of the lot. But on the other hand, remember you will have to pay taxes on the extra property so it is advisable to

consider the present and possible future tax rates.

The home that shelters growing children should, if possible, occupy a lot with sufficient room to allow outdoor exercise, and should be located near schools. Values are more stable in the vicinity of schools and where transportation facilities are available. These are only a few of the many factors to be kept in mind if an increase in value is expected.

CHAPTER III

Legal Safeguards

Title Insurance

WHEN a decision is finally made and before title to the lot has passed to you it is positively necessary for safeguarding your investment to have the title searched and insured by a reputable title insurance company. The cost of this service is not great and title insurance is necessary in any case in which a loan is sought. Even if you are buying the lot from your dearest friend, or from a trusted relative, or if a search of title has been made only a week before, have a new search made when you make the purchase. Remember—if the bank makes a loan on the property it requires a search of title brought down to the last minute. The bank takes no chances—neither can you afford to do so.

Land Value Insurance

A new and worthwhile protection now available in several states is Land Value Insurance. With assurance that the title is clear of all encumbrances the next step is insurance against depreciation of value. No property is insurable until it has been appraised by duly authorized inspectors—a safeguard and guarantee that the buyer is getting full value for his money. When it is considered that scores of well defined factors affect the present and future value of property, most of which are beyond the control of the buyer, the need for this protection becomes clear. If depreciation does occur, the legal reserve insurance companies offering this service pay the difference between the purchase price and the depreciated price. Premium rates are low, averaging about 65c per hundred dollars per annum.

Survey to Establish Property Lines

Have a competent surveyor check the stakes marking out your lot. If you are buying in a new subdivision the engineer employed by the land company will probably do this without extra charge. If in an old tract, or if

your lot is divided off from a larger piece of property, employ a surveyor to give you a legal description of the lot and to set stakes at the corners and on the property lines.

Zoning and Building Laws

Go to the City Hall and find what zoning and building laws apply to the property you contemplate buying and to near-by property. You may find that, while the neighborhood is now restricted to single family residences, there is an application under consideration to permit the re-zoning of certain neighboring lots for some undesirable types of occupancy—it may be that the lot or home is offered to you at an "attractive" price because the present owner has foreseen undesirable changes in his neighborhood.

A lot selected along the lines suggested here and safeguarded by the protective measures available to all should be an asset that constantly increases in value, and when a really well built house is erected on such a lot, the value of both is increased.

CHAPTER IV

Choosing an Architect

TO design and to build a home is not an easy task for one who has not had an education in the builders' art. It is not an easy task for even the trained architect—even he must study and ponder over each new structure he designs. To the architect, as to the doctor, each new case is different from all preceding it; for each succeeding client the architect must make use of his past experience plus his judgment, artistic sense and engineering skill. Besides this, the architect must deal with the contractors and municipal ordinances as well as have a comprehensive knowledge of all the various building materials on the market. He has learned the terminology of the builders' trade and he has a just appraisal of the value of materials so that he can quickly and correctly decide a debated question.

Moreover, he is best qualified to select your contractor, due to his contacts with builders on previous building jobs. It should be your architect's responsibility—and one which he will glady assume—to engage a reliable contractor who has a good credit rating, and who is of a temperament to take your personal suggestions in good faith and to carry them out if practical.

These things appear, perhaps, to come easily to the architect because he can do them without ap-

parent effort; but we should not be lulled into the belief that his work is easy or that it may be done with as little difficulty by one without a similar long schooling. Remember, your own occupation —whether you are a lawyer, a doctor, a manufacturer or a merchant—may appear "easy" to one not acquainted with its endless details.

Practically a half century of intimate acquaintanceship with the building industry inclines us to recommend no other course than the placing of your home building problem in the hands of an architect. He will save you an amount far more than his fee, he will eliminate grave technical errors in structural design, will secure for you a harmony in color, line and mass which are probably beyond your own powers and will save you from years of petty and large annoyances. Possibly the architect might not be so necessary to you if you could "cut and fit"—if you could tear down and rebuild features which do not please you. But you cannot. If you incorporate an error in some major feature you must live with it as long as you live in the house. If the error is minor, you can change it—but you must pay the piper—and pipers charge full prices for all changes and alterations.

Finally, you should not forget the undisputed fact that houses which are built by qualified architects command a much higher price than those not so built. Some day you may wish to sell your house.

Planning the House

It is helpful—to the architect and yourself—to determine in advance (1) how much room you will require, (2) the general type of house best suited to your tastes and to the natural environment of the property on which it is to be built, (3) the arrangement of its interior, (4) the intended arrangement of the interior furnishings and (5) location of electrical (base plug and lighting) outlets, gas, water and heating connections.

The architect first prepares a set of *sketches,* including floor plans and elevations, which embody the ideas of both the owner and himself.

After these are studied and criticised, perhaps even completely redrawn, the *working drawings* are prepared for the guidance of the men who actually build the house. These drawings should be gone over carefully by the owner, room by room, detail by detail, to be sure they are satisfactory in every way and embody every desired feature. This precaution will prevent unnecessary delays and added expense necessitated by changes made during construction.

Next come the *specifications,* a document explaining every point and specifying the methods of construction to be followed throughout the building, and the

materials to be used. The plans plus the specifications give complete instructions for the contractor and his men to follow.

The specifications should be studied as carefully as the plans. The owner should be sure that every detail and material is such that all defects and other disappointments are guarded against before the foundation is dug. It is to assist the owner to avoid many of these "danger spots" that this booklet explaining the Pabco Protected House and Pabco Products has been prepared.

CHAPTER V

Home Financing

PROBABLY more than half the homes in the United States are owned by families whose income is less than $2000 per year. Accordingly, with clear title to a well-selected building lot no man with a regular income need feel the least hesitancy about seeking a loan with which to build a house. The amount which must be borrowed represents in some cases a relatively small but more often a large part of the outlay.

Although conditions vary from one section of the country to another, the extent to which borrowing is necessary generally determines the financing methods employed. For the purpose of discussing the various plans now available, home builders may be divided into three groups as follows:

Three Groups of Borrowers

The first embraces those who can supply in cash 50 per cent or more of the price of the home, and who can get the remainder on first mortgage, deed of trust, or from several other different sources.

The second includes those whose cash resources are within the approximate limits of from 25 to 40 per cent, and who borrow the amount needed either on first mortgage or through the use of a second or third mortgage.

The third comprises those who have but 10 or 15 per cent of the price who sometimes finance through mortgage agencies, but more frequently by means of an installment purchase agreement.

Naturally, it is hardly possible to discuss fully the various plans now in popular use. For a clear and comprehensive analysis of the whole home finance system we refer the reader to the United States Department of Commerce booklet entitled "Present Home Financing Methods." This can be obtained by request to the Superintendent of Documents, Government Printing Office,

Washington, D. C., with the enclosure of five cents.

First Group

Where 50 per cent or more of the money is advanced by the owner.

BUILDING AND LOAN ASSOCIATIONS

This is an important financing source in this group. Inasmuch as Building and Loan Associations make a practice of lending considerably more than half the property value where such loans are required, they are discussed in connection with the second group of buyers.

INSURANCE COMPANIES

The loans of life insurance companies are placed through local agents—banks, trust companies, mortgage companies, and individuals trained in the work. These agents are permitted to accept applications only in connection with properties located in developed sections where values are stabilized.

After the applicant supplies the loan agent with information bearing on the risk, it is thoroughly investigated and an appraisal — invariably conservative — is made to the loan company. This appraisal should not be compared with the estimated cost of constructing or buying a home as many times the agency leaves out certain items which are real elements of worth.

The insurance company loans run for periods up to 15 years. Interest depends on the prevailing local rate and is usually paid semi-annually.

Although insurance companies as a whole are loath to lend their funds for construction purposes, a temporary loan may sometimes be arranged. This is based on the company's willingness to take over the financing when the structure is completed. Where banks and other financial institutions act as agents, they often advance their funds for the building period after which the loan is transferred to the insurance company.

SAVING BANKS

Savings Bank loans are frequently made for short terms—for periods of one, three and five years—and are repayable in full at the end of the term. An increasing number of banks, however, are now making long term loans repayable in installments similar to building and loan associations.

A number of savings banks do not lend for construction purposes, as the risk is regarded as too great. However, where a bank does make this type of loan the owner or contractor is usually required to furnish a bond guaranteeing the completion of the building according to plan.

TRUST COMPANIES

The lending policies of this type of institution are similar to those of the savings banks—the capital being furnished through

trust funds and large savings deposits.

MORTGAGE COMPANIES

Because of the general absence of legal restrictions and a lack of general uniformity in the policies and methods of this class of company no general statements can be made as to how it functions.

Their loans are made for both short and long terms and on the amortized or straight basis. Many of the companies devote a large percentage of their funds to construction loans.

PRIVATE INVESTORS

In this class there are, naturally, fewer restrictions and less standardization than in the mortgage companies. Policies usually tend to follow those of lending institutions in their community. Since they are not handling the funds of others (except when acting as trustees) they have greater freedom of action and are often found willing to advance a higher percentage of property value.

Although we do not advise against a private loan we strongly suggest that a competent attorney be employed to arrange all details for you and to inform you of your rights in the matter.

Second Group

For those who can advance from 25 to 40 per cent of the home cost.

BUILDING AND LOAN ASSOCIATIONS

The building and loan association is an organization created for the promotion of thrift and home ownership. It accomplishes its objects by providing a method of saving and by lending its funds for the purchase and construction of homes.

Various plans for obtaining funds are employed by the association. Under the plan in most common use the members subscribe for "shares" and make regular stated payments on them until the sum of these installment payments, added to the dividends obtained through the lending operations, equals the matured or face value of the shares.

Building and loan associations usually pay a higher rate of return to their depositors than is obtainable from other savings institutions, and prospective home owners, who place their savings in the association may often accumulate sufficient funds to make the first payment on their homes more quickly than is possible by any other method.

Applications for loans are received usually from members only, but in many associations the home owner may easily enter the membership and apply for a loan at once.

Borrowers seeking construction loans often find it to their advantage to pay the slightly higher rate asked by building and loan associations because of the specialized service and advice offered by the association in connection with the building project.

SECOND MORTGAGE BORROWING

In communities having no building and loan associations and in those where the association and other agencies are unwilling to supply on first mortgages from 60 to 75 per cent of the amount needed to acquire the home, borrowers in the second group generally find it necessary to use two loans. The first is obtained from any of the groups previously mentioned and the second from an individual or organization advancing funds on second mortgage security. This latter class is frequently called "second" or "junior" mortgage companies. Naturally, because this type of lending company's rights are legally subordinate to first mortgage lenders and due to the greater risk involved it must be expected that the rates will be proportionately higher.

Third Group

For home buyers or builders who only wish to make 10 to 15 per cent cash payment.

THE THIRD MORTGAGE

Here, the rates are even higher than in second mortgage borrowing, due to the fact that first and second mortgage loans must be legally paid off first.

THE LAND CONTRACT

Another, and more widely used financing plan in this group is founded on the land contract. It is simply an agreement between the buyer and seller under which the former makes a small down payment and agrees to pay the full purchase price in installments, frequently monthly. Title does not usually pass to the buyer until, say 50 per cent has been paid.

Of these different methods, we do not recommend any one above another—they are all fairly administered. Some may have advantages over others in different localities, or some one may appeal to you more than another.

In general, we will say that it is advisable to consult an attorney in connection with your plan for financing no matter how simple the plan may be. Remember you are dealing with comparatively large sums of money and an error may be costly. An attorney will anticipate the existence of loopholes through which your money might slip away from you.

CHAPTER VI

The Contract

IT is almost a certainty that your home will be built by contract, no matter by whom it has been designed or financed. At times and in certain localities homes may be built by "day labor" but nearly every man wants to know before he begins building exactly how much his house will cost. When money is borrowed to build a house it is perfectly logical that the lender must know that the money is to be invested in an actual house and that the house will be completed—otherwise he might have no good security for his money. The contract provides for building the house to completion within a certain time and according to definite plans and specifications and for the payment of a certain amount of money at stated intervals to the contractor.

Legality of the Building Contract

It may be said at once that the architect will take care of your interests in drawing the contract —that is one of the important things for which you pay him. He probably has had the contract prepared by his attorney, so that no legal loopholes exist in it. It may be said in passing that of all documents to be signed in connection with your home, the contract takes second place to none in the necessity that it shall be properly drawn from the legal point of view. Such a matter cannot safely be left to the contractor (who is an interested party) and yourself, unacquainted, as you probably are, with the technicalities of the law. This is true even without presuming any dishonesty on the part of either. Simply imagine that your contractor becomes insolvent, dies, or sells his business during the term of his contract. In that event it would be very difficult to convince his successor that any specific verbal understanding had existed. His successor's knowledge of the matter merely would be the written contract and from his viewpoint he would be justified in going no further than the actual specifications.

Special Provisions in the Contract

It is impossible to specify in advance some of the features you will wish in your house. Usually the owner wishes to choose the electric fixtures and hardware. They may be omitted from the contract, or lump sums—say $150 for each—may be provided by the contractor to cover the cost of these items (not inclusive of any house wiring or installation

of hardware). If these cost less than the sums provided, the difference will be deducted at the time of the final payment.

Also at the time of the final payment any agreed amount may be deducted for failure of the contractor to follow out the provisions of his contract. For instance he may not be able to supply the kind of hardware specified because of its withdrawal from the market and in its place may supply (with the consent of the owner) lower priced hardware. The agreed difference in price is deductible.

Provisions for Extras in Contract

Another item which must be adjusted at the time of the final payment is the matter of paying for any "extras and changes." This means the extra work and material furnished by the contractor aside from that shown and called for in the plans and specifications. Remember—it may be that no extra material may seem to be involved—you may merely have asked that a door be moved six inches to the right or left. But this change may involve expensive changes in framing, piping and wiring. It is generally true that even small changes or extras seem to be far more costly than their relation to the remainder of the house and the contract price would seem to indicate. Yet we cannot believe that the contractor is unfair in such charges. He must charge for extra trips to the planing mill, for work already finished which must be torn out, for men called back to the house after their regular tasks have been completed.

The best plan to avoid trouble with "extras and changes," is to be absolutely sure what you want from the beginning and then stick to it—don't order the contractor to make changes. The assistance of the architect is invaluable here. He has had so much experience that he is not in the habit of forgetting some detail and ordering it added later at an increased cost.

If changes are made, they should be ordered in writing with complete details of the work to be done, materials to be used, and the agreed upon cost carefully stated. There will then be no possibility of a dispute with the contractor, or of forgetting the extra cost that must be paid when the contract is completed.

Final Payment 35 Days After Completion

An element of uncertainty regarding the claims of various tradesmen on the building is removed by the provision that the last payment shall be made to the contractor thirty-five days after the completion of the building. If one of the tradesmen or sub-contractors working on the building is not paid by the contractor, he can file a lien which will make any moneys due to him deductible from the amount to be paid the

contractor at the final payment. If, however, the final payment was made, say ten days after the completion of the building, the tradesman or sub-contractor having an amount due for his work could not obtain it from this final payment; failing to do so, he would place a lien on the building —in other words the owner would probably have to pay and would have no redress, aside from court action, from the contractor. After thirty days in case Notice of Completion is properly filed such liens cannot be placed on the house, so that the owner is thus freed from any financial obligations of the contractor.

"Notice of Completion" in practically all states is required to be filed with the County Recorder in the county in which the building is erected.

Insurance Clause in Contract

The contract should provide for fire insurance to be taken out on the house to protect the contractor's and the owner's interest therein during the time of building and up to the time of final payment in proportion as those interests appear in the structure. In some communities this insurance will include the "falling building" clause. Clauses to cover damage from other sources as from falling airplanes and falling trees, may be added at little extra cost.

The contract being signed, which mentions a definite time within which the work contracted for must be completed, the contractor at once begins operations.

It should be mentioned in passing that there are several important matters such as prompt payment by the contractor of his bills, compensation insurance, etc., which should not be overlooked. These can be attended to by your architect or legal adviser.

CHAPTER VII

Excavation, Foundation and Basement

THESE three items may be considered together as they are usually executed by the same force of workmen. Again, the foundation and basement are generally built of the same materials.

The principal things which are revealed by excavation are the load bearing value of the soil and its probable water level. We cannot go into the subject of load bearing value of soil; the subject is highly technical and is influenced by factors presented by different characteristics of soils.

Since the question of loading on soil can be answered only through technical knowledge and experience, it is best to leave it to the architect. He will accordingly

calculate the width or area of the "footings" (the bases of the various parts of the foundations).

Finding the Water Level

The water level of soils usually varies. In some locations it may be found only at great depth during the dry season, but during wet weather the ground may be so saturated with water that a shallow spade hole will fill with muddy water in a few minutes.

Probably the most deceptive soil is one in which the ground water level will rise only a little way above the basement floor level during some exceptionally wet winter.

Since houses are usually built in the dry season it is not always possible at the time of building to determine the wet season water level.

If, as sometimes happens, the lot has been purchased a year or so before the house is built, it becomes possible to put down a small test hole with a hand operated well borer and to watch the water level during the winter. If neighboring lots have houses on them, data on the soil may be obtained from the owners. Allowance should be made for the exceptionally rainy winter.

Changes due to building operations may also affect conditions. The rain water from your roof and your neighbor's roof may work into the earth alongside your basement, thus raising the former water level.

Mere dampness in the earth surrounding the walls of the basement is not difficult to combat. Actual water pressure against the basement walls from without is more difficult to combat, but it also can be handled.

The basement under the house may be extensive, as when it is to be used for storage, for laundry purposes, for the furnace, for a home workshop and even as a garage. In other instances the basement is made just large enough to hold merely the furnace and a small stock of fuel. Waterproofing or dampproofing, however, as described below do not differ in either case.

Dampproofing Concrete Basement Walls and Floor

If the ground water level is well below the basement floor, winter and summer, and is not likely to be raised due to changes in the occupancy of the land, mere dampproofing and good ventilation are sufficient to safeguard the basement against moisture.

The first step in dampproofing is to secure well constructed substructure. In the case of concrete, the mixture must be of the right kind to give a dense concrete free from "honey-combing" when properly placed and cured. Frequently hydrated lime is added in the proportions of 1 part of lime to 10 of cement to make the concrete denser, more easily worked and more waterproof.

However, we would not advise

that even good concrete be entirely trusted to keep out all moisture. Moisture will penetrate long distances through solid granite, sandstone or similar rocks. How much more likely it is then to penetrate concrete.

Pabcobond for Basement Walls

On the outside of basement walls we recommend a thorough coat or even two coats of No. 1072 Pabcobond. After this is applied, do not back-fill the earth until a thorough inspection has been made to see that all pores in the concrete, however small, are filled and coated over; also do not back-fill until the Pabcobond is dry.

This treatment will mean that the excavation shall be sufficiently large so that the workmen can work comfortably between the concrete and the earth bank. It also means the subsequent removal of wood forms—a most desirable practice.

Malthoid Roofing Dampproof Floors

Under the floor we recommend that an under layer of light weight Duplex Coated Malthoid, Pabco or Durable Roofings be laid on the ground before the concrete is poured, that this material have not less than 6-inch laps where edges of the sheet meet, and

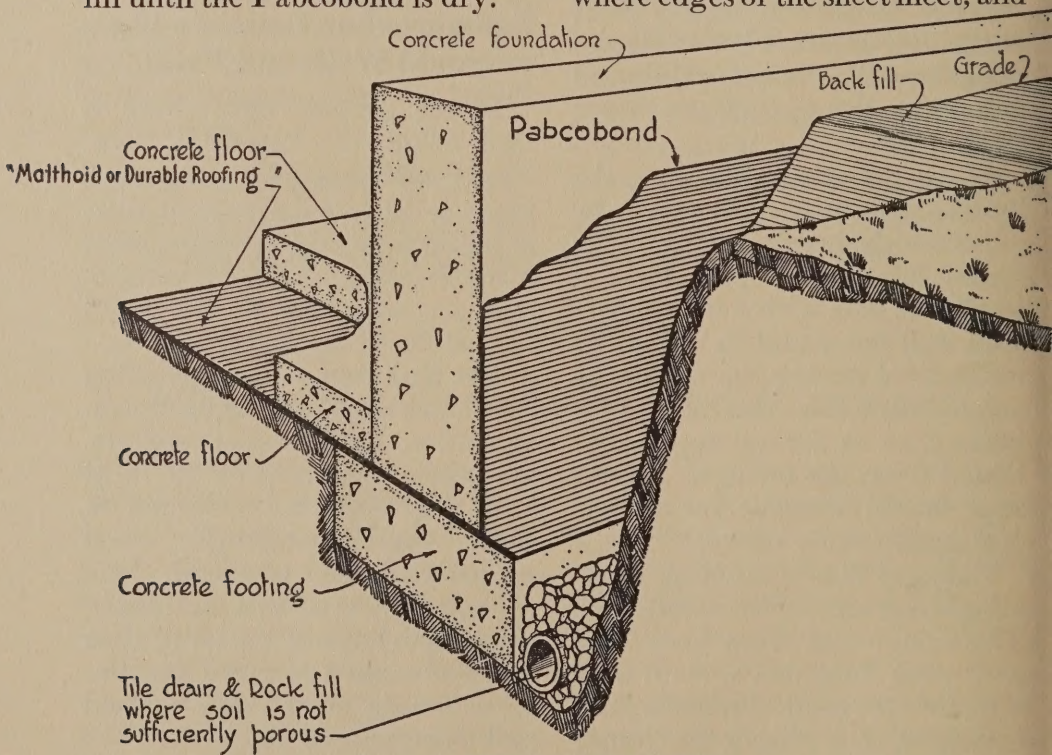

Fig. 1. BASEMENT DAMPPROOFING
Used where earth is moist but where groundwater level is permanently below basement floor.

that the laps be sealed with No. 2 P & B Paint.

This treatment must not be confused with waterproofing. The treatment described in the preceding paragraphs will hold back the moisture of moist earth, but must not be depended upon to hold back actual water which arises up in a liquid body around the basement walls.

Waterproofing Concrete Basement Walls and Floor Through the Pabco Membrane Method

If the basement floor goes below the highest water level, or even if it does not seem to reach water level by several inches, waterproofing must be applied to basement walls and floor. There is apparently only one way to waterproof a basement structure located below or partly below water level, and that is by the membrane method of waterproofing.

In brief, Pabco membrane waterproofing consists of the application of two or more layers of Malthoid Dampcourse—a saturated and coated felt-base material—to the outside of the basement walls and to the underside of the floor. The layers are solidly cemented together with hot Floatine which is a practically pure and extremely water resistant asphalt.

To accomplish this, a light base slab of concrete is first laid on the bottom of the excavation. Protective side form walls are then built up. After this the entire exposed inner surfaces of the sub-floor and the protective walls are covered with the Malthoid Dampcourse Membrane. This procedure actually provides a completely waterproof cup into which the main part of the basement structure is laid and poured.

The actual floor slab is laid on top of the membrane. Inside forms for the main side walls are then built and the concrete is poured against the side wall waterproofing membrane. The outer protective wall is allowed to remain permanently in place.

Steel reinforcing should be used in the concrete, and sufficient of both materials should be used to resist the inward force exerted due to water pressure. The protective wall and the sub-floor offer little resistance to this inward pressure of the water.

Such waterproofing is effective to the last degree, this method being used in immense city office buildings, where perfect waterproofing is demanded and permanence is absolutely imperative.

Detailed instructions as to the number of layers of Malthoid Dampcourse, the quantities of Floatine (asphaltum), etc., will be furnished on inquiry, as they usually vary according to conditions.

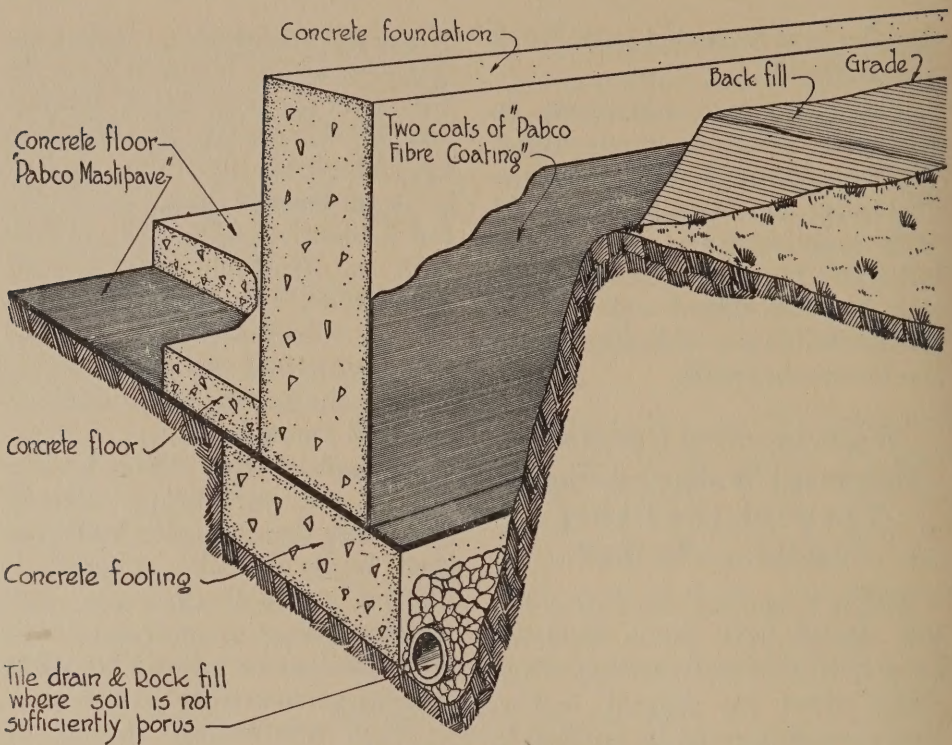

Fig. 2. BASEMENT WATERPROOFING
Used where actual water pressure is or may be present.

Dampproofing and Waterproofing Other Foundation Materials

The treatment outlined and recommended for concrete basements is also applicable to walls of other materials, i.e., masonry, brick, etc. Detailed information will be furnished on request.

Building a Dry Basement Is Not Expensive

While these precautions may seem to involve a great deal of work, yet if they are properly planned the work is actually carried out quickly and at a relatively low cost.

It should be remembered that the methods described here have been proved many times and are definitely known to give perfect and permanent waterproofing. (Other methods tend toward the unreliable.)

If, as does happen, a makeshift unreliable method of waterproofing fails, the basement will be damp and may partly fill with water. In some cases in which water pressures were not guarded against at the outset, it has been found to be practically impossible to waterproof basements afterwards, unless the fixtures are removed and the entire basement then lined by the membrane method. Even after this, it is

necessary to build new concrete walls and floor inside the old walls and over the old floor!

Drainage to Sewers

If the basement floor is above sewer level, a drainage to the sewer may be arranged. This is quite common where there is a garage constructed beneath the first floor of the house and below ground level.

In such a case a great deal of water would collect in the garage runway from the yard, or street, unless some such system of drainage were provided to care for all incoming drainage water.

However, dependence on the sewer may be a doubtful makeshift. Sewers frequently fill up during storms and overflow manholes in the street. Placing a sewer connection below the street level should only be done if positively necessary and then only if it is known the sewer is so constructed that it is safe from overflow.

If such a connection cannot be trusted, dependence must be placed wholly on waterproofing and no possible avenue allowed for water to enter from the outside.

As an extreme measure, there are sump pumps which can be used to remove water in the basement, such as from garage runways, washing machines, and the like.

In passing it may be said that toilet, bath and laundry connections to the sewer from the basement are frequently subject to possible overflow in times of storm. This detail should be taken into account when planning the basement.

The decision of the local Sanitary Inspector will govern in all cases where connections to the sewer are to be made from spaces below the ground level.

Finishing Basement Walls

The inside finish of the basement demands more than mere passing attention. Even if the basement walls are above water level, they may have a considerable amount of moisture in them; the concrete may appear dry, but if its surface is sealed up with paint the moisture will then "come to the surface." The concrete only appears dry because the air currents in the basement continually remove by evaporation the small amount of moisture which constantly comes through. Good ventilation in the basement is absolutely essential.

Use Pabcobond Before Plastering

Only if the basement is waterproofed or dampproofed—as the condition demands — would we recommend plastering and finishing basement walls.

In plastering the first step is to treat the walls with two coats of No. 1072 Pabcobond, the first either a brush or spray coat, the second a carefully applied brush

coat. Within one or two days' time, hard wall-plaster may be applied and may be finished in a rough or smooth finish. Never use cement mortars over Pabcobond or any plaster bond; they cannot be used successfully over such coatings without provision being made to key them to the wall.

Baseboards may be applied by securing them to wooden "plugs" which have been driven into the concrete and properly dampproofed.

Pabco Undercoat and Pabco Multi-Service Enamel for Basement Walls

To obtain the best decorative finish for basement walls, apply two coats of Pabco No. 600 Undercoat. Do not apply any gloss finish over this. After allowing the Undercoat to dry thoroughly, a coat of Pabco Multi-Service Enamel or one of the special Pabco painters' enamels may be applied.

The ceiling in the basement may be constructed by lathing the bottom of the wooden floor joists of the first floor and plastering, or by applying plasterboard or Pabco Wall Board to these joists.

Basement Floors

If a wooden floor is to be placed in the basement, it should have 2x4-inch—or larger—timber under it. Preferably this timber should be redwood and should be thoroughly painted with P & B Paint where it touches the concrete. The concrete floor under the wooden floor should be given a thorough coat of No. 1072 Pabcobond.

If a tile floor is desired a coat of No. 1072 Pabcobond should be applied to the concrete surface before laying the tile.

CHAPTER VIII

Framework

A well-built frame is essential to the worth of the house; the frame corresponds almost exactly to the bones of the body—it is the skeleton of the structure. But the bones of our body are loosely joined so that the body members may have movement. The framework of a house must be as rigid as possible, else structural movement will cause cracked plaster, creaking in wind storms, stuck doors and window sashes—or even more serious ailments.

Proper selection of materials for the skeleton of the house is essential and careful workmanship is imperative if the building is to be a good investment and a source of pride to the owner.

The kind of lumber to be used, the type of frame construction,

the "grade" and size of "dimension" lumber for a certain span and load, the bracing and bridging of studs and joists, and the many other details of building construction are matters for the architect to determine.

The owner, however, should go into these matters with his architect and should study the specifications the builder is to follow, to be sure that at no point is a desire for economy preventing the securing of solid construction.

In general, where there is any doubt as to which of two materials or methods to use, it is a safe rule to select the better material or method, even though its use may entail what may seem at first to be an unnecessary added expense. Unless the additional cost is such as to force the total building appropriation beyond the limit the owner can afford, the investment in the long run usually will pay good dividends in solidity of construction and the saving of repair bills.

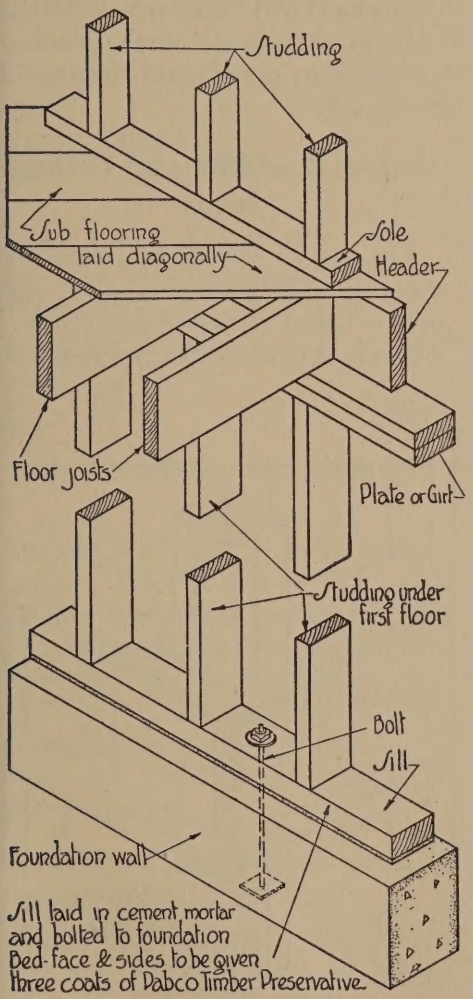

Fig. 3. DETAIL OF FRAMING AT BASEMENT AND FIRST FLOOR.

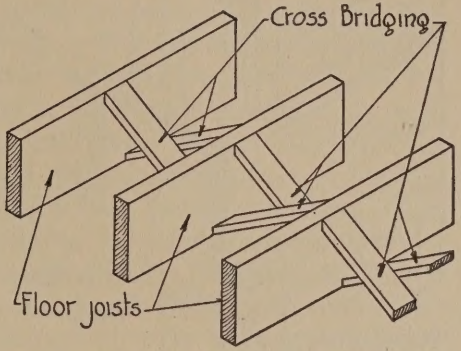

Fig. 4. BRIDGING BETWEEN FLOOR JOISTS.

Mudsills, Underpinning and Floor Joists

The framework begins with the "mudsills" which are bedded in cement mortar on the top face of the foundation.

Next in order are the underpinning (pieces of timber set upright on the mudsills) and posts. Posts often are not used as the basement partitions take their

place. But where there is no basement there are nearly always posts to support the central part

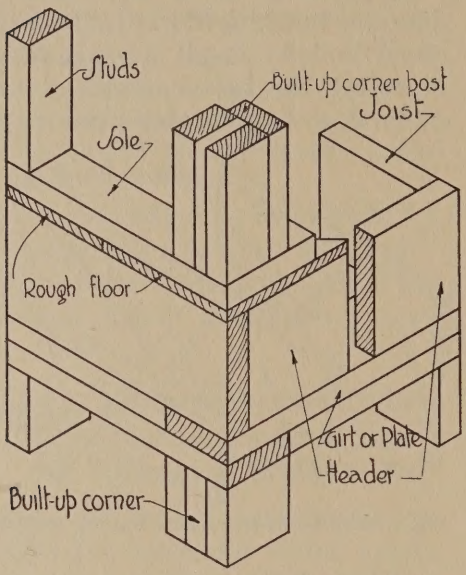

Fig. 5. DETAIL OF CORNER AT FIRST FLOOR.

of the large first floor area. The tops of the posts are connected by girders or "caps." The underpinning has "plates" along the top—the same with basement partitions.

On the plates of the underpinning and basement partitions and on the girders resting on the posts (if any) the floor joists are placed —these are timbers set on edge to obtain their greatest strength and rigidity. The floor joists are kept standing edgewise by "bridging" nailed between them. This bridging may be either "solid" or "herringbone." Solid bridging or a continuous "header" is always used at the ends of the joists around the outside of the house because it not only holds the joists firmly in place but it closes the spaces between the timbers. Solid bridging is also commonly used over the girders or "bearings." Herringbone bridging may be used in the center of the joist span, but here also solid bridging may be used to the full depth of the joists. Probably herringbone is preferable in the middle of the spans as it will "take up" with the natural shrinkage of the lumber and remain more rigid than solid bridging.

Plates, Studding and Ceiling Joists

On top of the floor joists another set of plates or "soles" appear—these to carry "studs." Thus is repeated the story of the

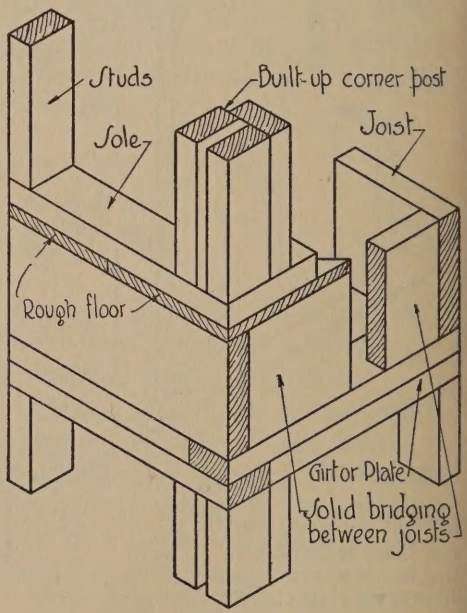

Fig. 6. DETAIL OF CORNER AT SECOND FLOOR.

"underpinning." On the first story the "mudsills" are named "plates" or "soles" and the "underpinning" is termed "studding." At the top of the studs double plates are used and then come the joists for the second floor or, if the house is to have only one story, the "ceiling joists." The plates and studs of the second story are duplicates of those of the first story.

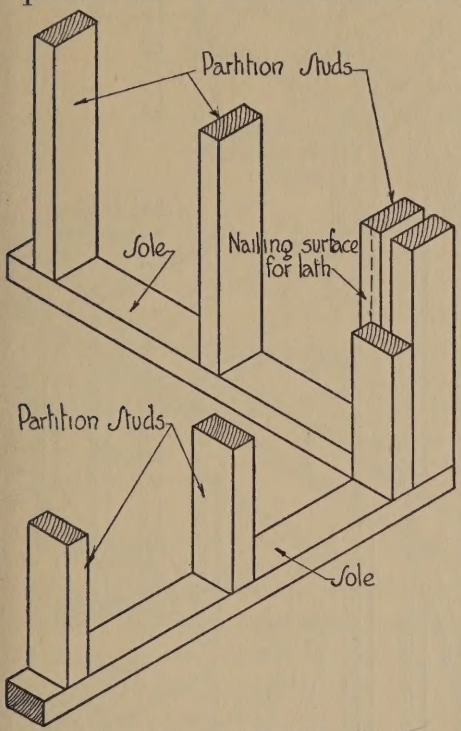

Fig. 7. TYPICAL PARTITION CORNER FRAMING.

Rafters

The skeleton of the roof is termed the "rafters." These usually rest on the plates on which the ceiling joists rest, but sometimes there is a studded space between the ceiling joists and the rafters. This makes a more roomy attic space.

Sub-Flooring

The sub-flooring or rough flooring also appears in this skeleton structure. As soon as the floor joists are laid, a floor is laid over them—this ties the joists together during building, and also serves as a platform on which the carpenters may work. All openings for stairs, chimneys and hearths are left in the sub-flooring. The plates for the studded exterior walls and for partition walls rest on this sub-flooring instead of being set directly on the joists themselves.

Sometimes the studs extend to the full height of the walls. In this construction the floor joists are made to rest on a "ribbon" notched into the studs and the joists are further secured by spik-

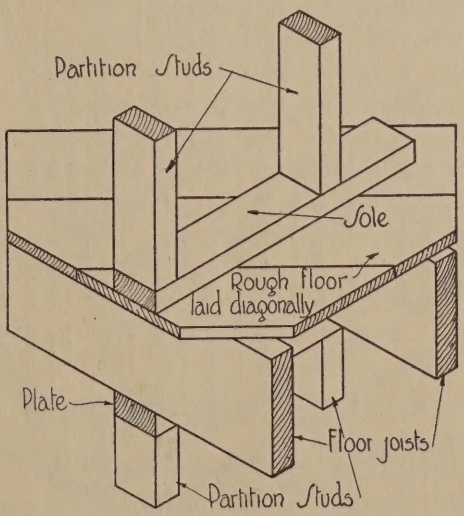

Fig. 8. METHOD OF PARTITION FRAMING.

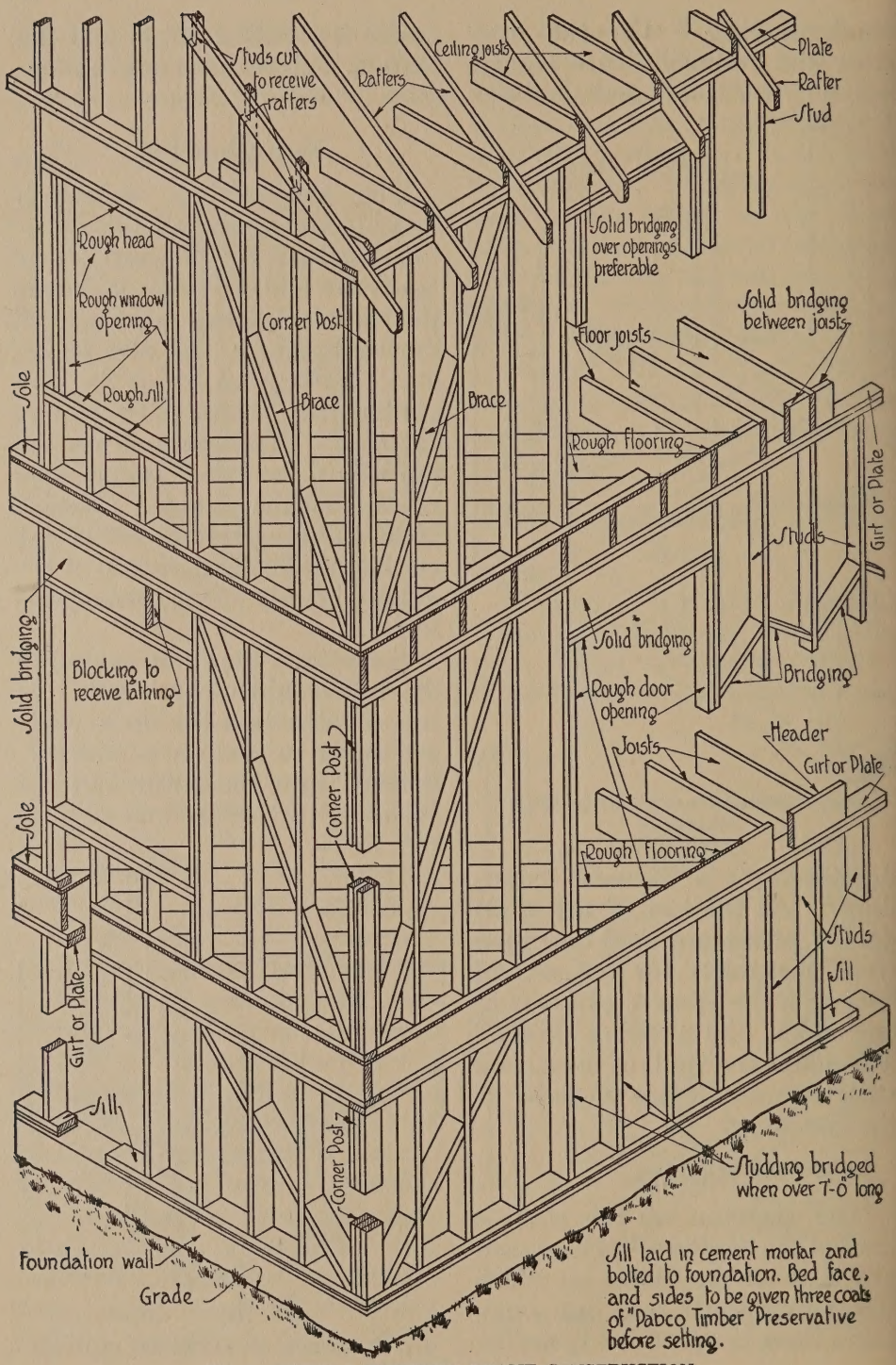

Fig. 9. TYPICAL WESTERN FRAME CONSTRUCTION.

ing to the studs. Where there is to be a studded space between the ceiling joists and the rafters, this

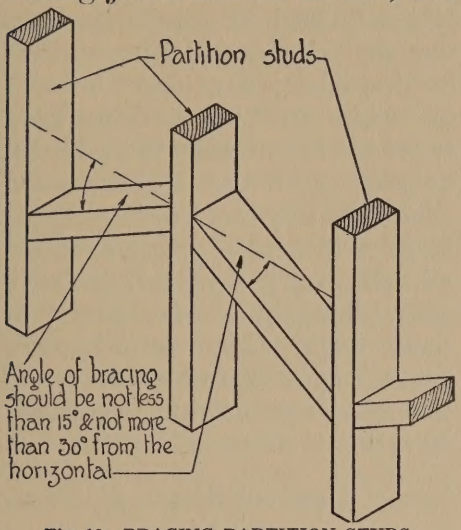

Fig. 10. BRACING PARTITION STUDS.

type of construction is quite generally followed in the building trade, i.e., the studs of the upper story are not cut off at the ceiling line but extend up to the rafter line.

Braces are required at corners of the building. These are accurately cut to fit in a diagonal line from the top plate to the bottom plate, being nicely fitted in line between each pair of studs. Extra braces should be used in some of the partitions. In general, it may be said that too much diagonal bracing cannot be employed in underpinning and story walls. At times some braces have to be omitted or broken because of window openings.

Good Materials Are Essential in Framework

Proper selection of materials for the skeleton of the house is essential and careful workmanship is imperative if the building is to be a good investment and a source of pride to the owner. Mistakes in the skeleton are covered over with lath, plaster, sheathing, stucco, paint, roofing and flooring. It is costly to tear these away later to correct a defect in the framework —costly is too mild a term—it is economically impossible. The only way out is to sell the improperly framed house for what it will bring, take the money and the experience and go elsewhere and build again and better.

The grades of lumber to use, the sizes and the general construction of the framework, are technical considerations involving stresses and strains. These details must be decided upon by your architect, and in many cases must be made to comply with building laws.

CHAPTER IX

Protection Against Vermin and Insects

THERE is always a constant menace in the home from insects and vermin. We are familiar with the ravages of mice. Rats are not often found in houses, but in closely built up communities

the possibility of their presence should be considered. Argentine ants are a well-known nuisance in many Pacific Coast communities. The actual menace which we are facing however, is that of the termites, sometimes known as "white ants." While these have always been present on the Pacific Coast, their presence has not heretofore been noted by the average householder. Within the last few years termites have been increasing in the built-up communities along the western coast of this country. The decreased amount of fallen wood in the forests, together with the shrinkage of the forests, certain conditions of food availability in fabricated wooden structures and like reasons have been suggested for the increasing number of termites in our built-up communities. The termites fly from older colonies to new locations, there drop their wings and proceed to establish their new colonies. Some species have habitations in the ground and work upwards from the base of a wooden structure, boring through the wood and devouring it as they go until mere shells are left of the formerly rigid timbers. On the other hand the dry wood termites enter generally above the ground line and establish their colonies there, thus confining their destructive work practically to the superstructure of the building. With this latter type a contact with the earth is unnecessary, making it much more difficult to cope with them.

A clear understanding should be established, by competent survey, that a house which is acquired by purchase is free from termite or "white ant" infestation. This is not always an easy point to determine and the utmost care should be exercised in having an inspection made by one familiar with the subject of termite ravages. This applies particularly to those areas where termites are common but should not be overlooked in communities where infestation is more infrequent.

Insect Control Starts at Basement Line

Considering first the termites which work upward from the ground and which must maintain a contact with the soil in order to keep up the normal content of moisture in their bodies, the problem of control becomes simple in principle, though requiring painstaking care to carry it out successfully.

In building the house the masonry foundation should be brought up above the ground so that it forms a continuous band at least two feet above the earth all around the house. Stucco may be brought down over this foundation wall if desired, but if the stucco comes down to a junction with the masonry, the two must be bonded together without cracks at the junction. This basement or foundation wall should

be so built and arranged in conjunction with the timbering resting on it that an inspection inside and outside may be readily made inch by inch around it at all times. The footings for all the basement partitions and posts likewise should be carried a sufficient distance above the ground so that inspection may be applied to them. Difficulty may be encountered in building the steps and porches so there are no blind spaces beneath them—steps and porches form a favorite starting place for termite attack; differences of ground level, and attachment of steps or porches to the main structure, may easily provide a place for establishing a habitation or an entry to the building itself. All foundation walls, footings, steps, etc., of concrete should be reinforced with steel to prevent cracking. Termites will conceal their runways in small cracks in the concrete and reach the timber superstructure by such a route.

The foundation wall should be capped with a sheet of galvanized iron of not less than twenty guage and this sheet should extend 2 inches beyond the inside line of the foundation and optionally 2 inches beyond the outside line of the foundation wall—all cross joints in this galvanized iron protector must be soldered. The overhanging edges should be bent downward at a slight angle. The top and bottom of this overhanging portion should be given a thorough coating of Pabco Fibre Coating No. 1094.

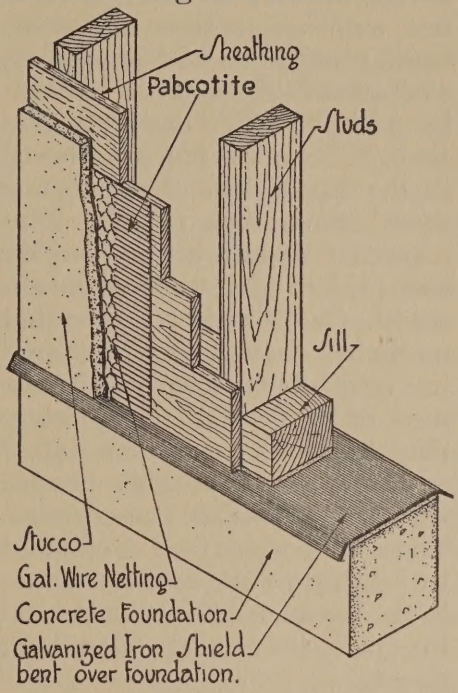

Fig. 11. METHOD FOR PREVENTING ENTRANCE OF VERMIN AND CRAWLING INSECTS.

Where openings for ventilation are provided, they should be screened with wire mesh sufficiently fine to prevent the entry of termites when the latter are seeking to establish new habitations. Local ordinances, however, may forbid use of wire of such a fine mesh. This is a matter which may require local inquiry.

Pabco Timber Preservative on Wooden "Mudsills"

The mudsills of the house should be given a thorough treatment with Pabco Timber Preservative. This may be applied as a

brush coat, but in such a method of application one treatment is not sufficient — three generous brush coatings should be applied, each time fairly soaking the timber with Pabco Timber Preservative. Where bolt holes are bored in the mudsills or the timber is sawed across, Pabco Timber Preservative should be thoroughly soaked into the wood thus exposed. Care should be taken that no timber or lumber is permitted to extend down from the framework of the house to any point on the foundation unless such timber or lumber is thoroughly treated with Pabco Timber Preservative. The above described treatment will apply to studded partitions in the basement and to posts and to the lowermost sheathing boards.

Vermin Control Inside the Basement

If the basement is to be finished with a plaster coat this treatment may be modified to a certain extent by carrying the plaster across the space between the mudsills and the foundation. Wooden lath should not be used under such plaster but metal lath may be used at such places and carried well up above the mudsills. Of course in this modified construction the turndown lip of galvanized iron must be made narrower on the inside of the basement wall and its edge brought just flush with the face of the plaster. In other words, termites should not be able to go above the galvanized iron lip without coming to the face of the plaster at that one point at least. Needless to say this plaster should not have wood fibre (or vegetable fibre of any kind) in it. Ventilation of this inner wall space is not necessary to protect against "dry rot"—the timber preservative cares for this condition.

An ideal construction is to build a reinforced concrete floor over the entire basement area—over all the earth surface beneath the house whether this is used as a basement or not. This should be examined periodically for cracks, and all cracks filled with Portland cement mortar or with Pabco No. 1042 Hydroseal. As an extreme precaution it may be desirable to build a flange of reinforced concrete, tied by reinforcement to the exterior of the foundation at ground level and extending out about twelve inches from the foundation wall. By such means as these the ground dwelling termite is forced to show traces of his workings and detection of his presence is thus made much more simple.

Frequent Inspection

Periodical examinations should be made to determine if earth has been piled against the protecting lip of galvanized iron. Care should be taken that shrubs do not afford a cover to conceal the travel of termites from the ground to the body of the house.

About twice each year the house owner should follow the galvanized iron lip around his house both inside and outside (if it extends outside) the basement wall and brush a coating of used automobile crankcase oil on the under side of the lip. This will make a sticky mixture with the original 1094 Pabco Fibre Coating and will prove an effective barrier against the passage of vermin, ants and the like.

Dry Wood Termites

Termites not requiring contact with the earth may enter a structure at any of its upper parts where favorable opportunity is presented. Usually such an opportunity is found where woodwork is exposed. The house with the most exterior woodwork therefore is most open to attack. It is difficult to detect where these dry wood termites enter; once established in the wood they do not come out except when members leave the old colony at "swarming time"—an event somewhat different from the swarming of bees—this may easily escape the householder's attention.

The best protection is to have the least possible amount of exposed woodwork. This is easily accomplished in so far as the roof is concerned. The roof should be of bituminous shingles as described in this booklet and so laid that there are no passageways between them, or else the roof should be of the Pabco ten-, fifteen- or twenty-year type. Here the advice of a Pabco representative will be of value.

All exterior woodwork should be thoroughly painted with Pabco Multi-Service Paint and all cracks, nail holes and other minute openings sealed with putty and likewise thoroughly coated with the Multi-Service Paint.

Window sash hung with cords and weights present the most difficult problem in combating termites. Here an open avenue exists, penetrating to the concealed recesses of the frame of the house. But even the frames of casement windows and outside doors, as well as the frames of sash hung by cords, present areas of bare wood which are difficult to protect by paint—these areas offer attractive starting points for the dry wood termite attack. It is probably feasible periodically to sprinkle sodium silicofluoride on the sash cords and between the sash and the casing and even to dust a certain amount of it into the weight compartments. This material is non-poisonous to human beings but is toxic to termites. Careful examinations will do much to render termite attack ineffective at window and door frames.

Periodic inspections of all exterior woodwork is necessary to cope with the dry wood termites — the termites which attack wooden structures above ground. Puttying of cracks and holes and thorough painting of every stick

of exposed wood are essential—especially just before the autumn flights of the dry wood termites. While puttying and painting may not constitute the final answer, yet they are among the best suggestions so far offered.

When dry wood termite infestation is somewhat advanced, little piles of pellets frequently can be found in those spaces where much wood is exposed—as in the attic—but, in fact, they may even appear on the floor of an occupied room, dropped down from workings above. A slender steel ice pick is a good tool to use in exploring suspected wood. If it reveals the presence of hollow places when "pegged" into the timber, a more extended investigation is in order. No house should be built which does not permit ready access to the attic space for such inspections.

The House Infested With Termites

If a house already infested with termites has been acquired, it will be necessary to clear the premises of them. This may involve certain reconstructional work and it may mean that several of the measures above suggested may have to be put into effect. The subject of destroying colonies of termites is not wholly within the scope of this booklet, and, indeed, has not yet been entirely solved. At the University of California* a considerable volume of work is being carried on not only to determine the best procedure under such conditions, but to discover effective means of protection and control. This booklet cannot very well anticipate the findings of the research committee engaged on the problem. More complete data may be had on this subject by writing to The Paraffine Companies, Inc., and stating the details of the problem under consideration.

To Keep Out Rats and Mice

The building ordinances of many cities now require a certain amount of attention to be paid to the rat proofing of buildings. This, of course, includes mice proofing. A strip of light galvanized iron laid horizontally in the walls at the bottom of the studded partitions makes it impossible for rats or mice to travel from floor to floor.

Usually in the ordinary dwelling house no rat proofing is used to prevent rats or mice boring directly through the floor boarding and thus getting access from floor to floor. But it is not an uncommon thing for these rodents to bore through the floor behind boxes, cupboards, cabinets and the like. It is advised that a metal sheet or a piece of quarter-inch mesh galvanized iron wire screen be laid between the double floors under all cupboards, closets, cabinets, etc., which are built as stationary fixtures in the house. It is

*See Bulletin on Termites, Department of Agriculture, University of California, Berkeley, California.

also recommended that attention be directed toward making it impossible for rats or mice to climb on any structural part of the basement or on materials stored therein by way of which they may reach a vantage point whence they may bore through the floor above. By means of runways built against the side of materials stored under the floor joints, termites, as well as rodents, frequently find a way into the structure above. Even if the materials do not reach to the floor joints the termites will extend their runways a certain distance upward through the air. Storage under the lower floor therefore always should be watched carefully.

Thus, with proper attention paid to this matter at the time of the original construction of the house, and with regular inspections and treatments, some of the most disagreeable and even dangerous household visitors may be excluded.

CHAPTER X

Sheathing and Lining

SHEATHING is the material used to brace and cover the framework on the outside, and it is nailed to the studding and rafters. It forms a portion of the outer shell of the dead air space in the walls, and composes the base upon which brick veneer, wood siding, stucco or other form of final outside finish is applied.

Sometimes solid sheathing is omitted altogether, the stucco or outside boarding being attached directly on the studding.

House Lining With Pabcotite

In any case, however, a house-lining must be used beneath the outside finish . . . and this house-lining is the one component of the house on which the owner must depend above all others for dry walls, freedom from draughts, economy of house heating, freedom from colds and other sickness, for comfort, health and economy.

Pabcotite Protection

With a full knowledge of the exact requirements that a house-lining must meet—a knowledge based on practically half a century's experience in dealing with problems of this sort—The Paraffine Companies, Inc., developed a material known as Pabcotite. And time has demonstrated that this product is admirably suited to the task it must perform.

Furthermore, in developing Pabcotite, the object was not

alone to make it better than all other linings, but to give it a distinctive appearance so that no one ever could confuse some other material with it. This was done simply in recognition of the fact that some such safeguard was wanted by home-builders, because to the layman, there is little difference in outward appearance between the finest house-lining and inferior "papers."

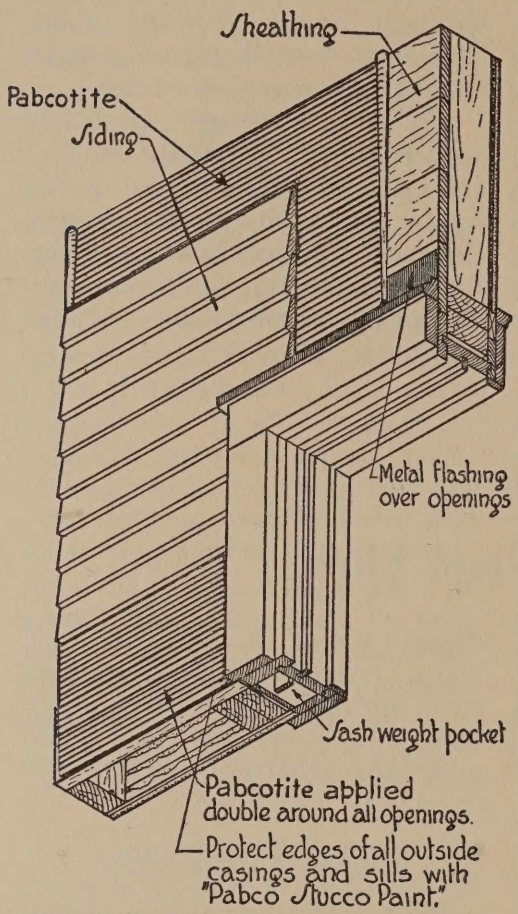
Sheathing
Pabcotite
Siding
Metal flashing over openings
Sash weight pocket
Pabcotite applied double around all openings.
Protect edges of all outside casings and sills with "Pabco Stucco Paint."

Fig. 12. APPLICATION OF PABCOTITE AND FLASHINGS AROUND WINDOW OPENING.

As a result, Pabcotite bears a distinctive red marking, with the designation "PABCOTITE" prominently displayed. This marking is on the side which will be exposed to view when the material has been applied to the building.

This, then, is the owner's protection—and indeed the contractor's protection as well—for it is a simple matter to discover that through an error a substitute material has been used, when Pabcotite had been specified. If the house is covered with Pabcotite it is covered with the best house-lining that could be devised after years of study of the problem.

When you consider that the difference in cost between the cheap products and the few bituminous house-lining materials, such as Pabcotite, is only about $10 for the average house, the folly of allowing "any old paper" to be used is very evident.

Applying Pabcotite

Long life for the framework, insulation against heat and cold, and perfect prevention of moisture seepage through the sheathing can be secured if Pabcotite is used to cover all wall sheathing. It should be used double-thickness around all door and window frames, as illustrated. It should be carefully applied with the edges well over-lapped so that the entrance of water into the house by "striking up" and "overflow-

ing" the edge of a sheet is prevented at every point.

Pabcotite is tough, easy to apply, inexpensive and will not lose the moisture-resisting qualities built into the material. Once Pabcotite is properly in place the protection against sheathing-rot and the infiltration of moisture is permanent and complete. If Pabcotite is applied in a workmanlike manner one more "danger spot" in home building is eliminated, which will mean added comfort and lessened depreciation for you.

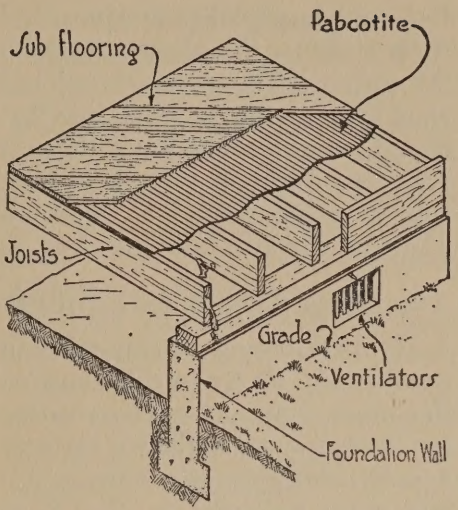

Fig. 13. USE OF PABCOTITE AS DAMPPROOF LINING UNDER FINISHED FLOORING.

Using Pabcotite in Construction of Lower Floor

As a dampproof lining under the finished flooring of the lower floor of the house a Pabcotite membrane, as illustrated, will prevent moisture rising from below. This is an important item as moist, cold air close to the floor is disagreeable and may even be the cause of colds not only in adults but particularly in children, whose bodies will be more deeply immersed in this lower stratum of air.

CHAPTER XI

Roofing

SELECTING your roofing is a great opportunity for you; not only can you there build well, and eliminate still another of the "danger spots" that have caused home owners so much expense and disappointments in the past, but it is also an opportunity for you to exercise your individuality. You can have color, design, and perfect protection—all in a roof that expresses your own ideal.

Cost and Appearance

When you consider what the roof of your house is to be, you are at once confronted with the double problem of appearance and cost. Appearance is extremely important, because probably one-third of the visible part of your house is the roof surface.

Cost is important because the cost of a roof covering on the average size house may range

from one hundred to five hundred dollars; even this does not reach the upper limits, as an occasional roof may go far beyond this figure. Generally speaking, there is no reason why a very beautiful roof covering cannot be obtained at a cost which is not excessive.

Changing Trends in Roofing

Roofs are now undergoing a revolution. Early in this century the most common roof covering for the home was either of slate or wooden shingles—the former being more common in the East than in the West, and the latter being quite universally used. The slate was always "slate" color—except that a certain amount of red or green or even variegated slate was employed at times. Wooden shingles were usually allowed to weather to their natural "weathered" color or at best were painted in a single color over all of the roof.

Tile in considerable quantity put in an appearance on residence roofs about twenty years ago—some of this was glazed tile in various shapes, but later the more simple unglazed tiles of the Spanish, or Cordova types and some of the flat tiles became popular. These allowed a variation in color and even an attractive irregularity in laying.

Then came the "brick top" roofs for homes—crushed brick on a base of several layers of asphalt-saturated sheets. These roofs included the gravel surfaced roof, marble surfaces, and others of similar character. But it really remained for the composition shingle to produce roof coverings at reasonably low cost and which provided all the charm and beauty which the roof of the house could be made to yield.

Today's Beautiful, Durable and Fire-Retardant Roof—Pabco Shingles

Pabco shingles have introduced roofs of color—roofs that need no painting or staining. These shingles are made in a variety of architecturally attractive designs; no small part of the beauty of a Pabco Shingle roof is derived from the irregular shapes, and the patterns and designs that can be created when the shingles are laid.

Beyond all this they are fire-retardant — proof against the menace of flying sparks, and thus completely eliminate a "danger spot" of long standing. You can be sure that your home can have no better protection than Pabco Shingles will provide.

The Roof of Variegated Colors

Every one seeks color now—inside and outside the house—particularly on the roof, and color in shingles brings us at once into the realm of art. The search for color does not mean that just any colors may be thrown together; proper color treatment is a matter of study, judgment, taste, experience and a dozen other human at-

tributes which we shall not name here.

In Pabco Shingles the development of colors and their blending has been treated as an art and not as a "hit-or-miss" matter.

Frankly we would advise that your roof covering be Pabco Shingles in some of the color tones—color tones you will be able to examine at your architect's office or dealer's store. From such a roof you will receive the maximum of service and the utmost in aesthetic satisfaction, and will have a roof covering which is so far fire-resisting that you need have no worry about a roof or "shingle fire." In fact in most communities such a roof covering will bring you a lower insurance rate.

Several Types of Pabco Shingles to Meet All Requirements

Pabco Shingles are made in several types, colorings and exclusive patented shapes reflecting the latest ideas in roof design. Some of the most popular of these shingles are here discussed.

Pabco Thatchon is an appealing combination of Old World thatch effect and modern smartness. Different methods of application and color design afford innumerable attractive roof patterns. These shingles are locked together as well as nailed to the roof sheathing.

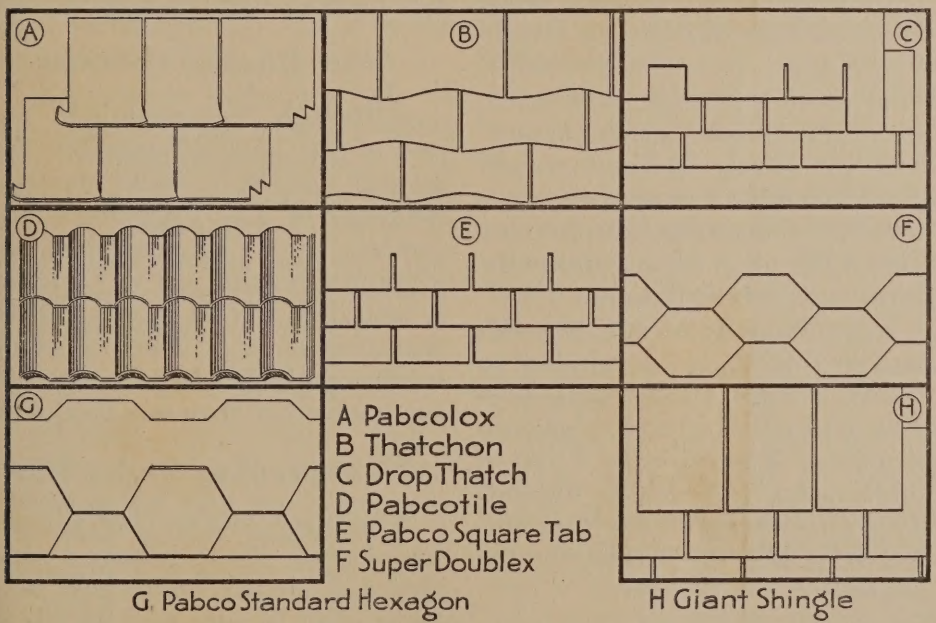

Fig. 14. STYLES OF PABCO SHINGLES.

Pabco Drop Thatch Shingles are in strips and are so tabbed that when laid they do away with the ordinary checkerboard effect and

produce the appearance of a rich tapestry. Drop Thatch shingles are suitable for nearly every type of home. They are made in a number of splendid color combinations and may be laid by either of two methods.

Pabcolox is the name given to individual shingles which are locked and nailed to the roof in an ingenious manner; they may be laid in six different arrangements in many different colors.

Pabco Giant Shingles are made of double-thick material and in a large size, giving an effect of massiveness with the shadow effects accentuated.

Pabcotile is an exclusive built-up bituminous tile having several advantages. It is constructed of waterproof materials, reinforced, and, while affording the typical Spanish effect, its light weight permits a lighter supporting construction than is required for clay tile and its strip form reduces the labor cost of installation.

Pabcotile may be cut, pressed, bent or folded, and is supplied in special shapes which make possible attractive hip and ridge construction. The typically Spanish coloring and astonishing flexibility in application allows the architect wide latitude in varying the tile effect.

Renewing and Remodeling Old Homes With Pabco Shingles

One of the major advantages of Pabco Shingles is the fact that when applied on an old home it is not necessary to first tear off the old wooden shingle roof. Pabco Shingles are applied right over the old roof so that the roof protection is multiplied by the fact that it consists of the old roofing plus the Pabco Shingles.

Another decided advantage is that there is no muss or destruction of delicate plants or shrubbery which is unavoidable when an old roof is torn away. Nor is there any time when there is no roof protection; Pabco Shingles can be laid at any time, although naturally it is better not to wait until the rainy weather before having the work attended to.

Other Roofing Materials

Although roof coverings are one of the largest—possibly the largest—of the building material products of The Paraffine Companies, Inc., as measured in volume and value, yet we feel that it would be unfair to you and to manufacturers of other types of roofing materials to advise you to use none other than our products.

Waterproofing Under Tile

You may prefer clay tile on your home—if so you have a wide choice of shapes, colors and textures. But be sure that the tile is underlaid with a layer of bituminous waterproofing material to provide against infiltration of air through the wood roof deck and to prevent possible leakage.

This bituminous waterproofing should consist of a well-laid, under-roof of Malthoid, Pabco or

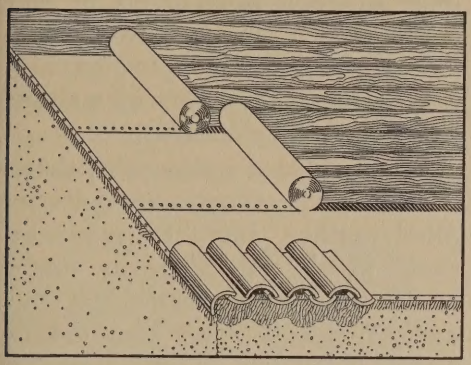

Fig. 15. WATERPROOFING UNDER TILE.

Durable roofing materials with all seams well cemented and nailed just as though this was to be the actual roof of the building.

Frequently saturated felts of various weights, some of them even quite heavy, are used for this purpose. It is sufficient to say, however, that such felts are not in themselves actual roofings—and an actual roofing is the material required for this service.

Other Roof Treatments

Should the owner prefer wooden shingles it will be economical in the long run to use only the best grade. Since common nails are of short life when used to attach wooden shingles they soon rust away and the shingles slip out of place. Hence, it is advisable to use galvanized nails.

Wooden shingles may be preserved and stained to any desired color by means of Pabco Multi-Service Paint thinned according to directions.

There are a few other treatments for sloping roofs—among which may be mentioned slate. Slate requires about the same treatment as tile with regard to an under-roofing; light Malthoid, Pabco or Durable is recommended. Cement shingles follow the slate practice.

How Roof Slope Affects Roofing

It is hard to draw the line as to what constitutes too flat a slope for any of the above roof coverings. Much depends on the severity of the weather in the locality concerned.

In general it may be said that wooden shingles are ruled out first as the slope decreases; this is because it is not advisable that a waterproofing layer be laid under wooden shingles. As a matter of fact it may be a doubtful policy to recommend wooden shingles on a slope of less than six inches rise to the horizontal foot.

Pabco Shingles, tile, slate, and cement shingles may be laid on roofs as flat as even four inches rise per horizontal foot, depending, of course, on the added protection of an under roofing material used on these flat slopes. On roofs with slopes of about six inches or more per horizontal foot, the under-roof is not needed for the Pabco Shingles.

Waterproofing Methods Where Snow Is Encountered

In snow countries it is always advisable, regardless of the amount of roof slope, to lay a layer of Light Malthoid, Pabco or Durable Roofings under the Pabco Shingles from the eaves to about six feet up the roof surface from the line of the building walls.

This is done because the snow will melt first toward the middle of the roof; the melted water will run down and freeze at the eaves and will dam up water coming down later—this water will rise above the top edges of the shingles as commonly laid and overflow into the building—the under layer of Malthoid will prevent this overflowing.

Pabco Ten-, Fifteen- and Twenty-Year Roofs

So far, we have considered only sloping roofs. Many buildings have nearly flat roofs—as a matter of fact what is now to be said will apply to absolutely flat roofs, scores of which have been built and successfully covered with Pabco roofs of the bituminous type.

All roofs which fall within the class of no slope to a slope of five or six inches per horizontal foot may be considered as flat roofs and may be roofed with the Pabco Ten-, Fifteen- or Twenty-Year Roofs.

Nearly every house has some roof area which is flat or nearly flat. It may be only a porch roof or it may be the flat "deck" over a door; on the other hand the roof over a large proportion of the house may be comparatively flat, as is the case of the house having a flat center roof deck with a slope to each of the side walls.

On such roof surfaces as these the Pabco specification roof is applied—either the "twenty-year roof" or the "fifteen-year roof" or the "ten-year roof." In the case of each of these The Paraffine Companies, Inc., signs a maintenance agreement with the owner to maintain the roof in water-tight condition for the stated number of years, twenty, fifteen or ten, as the case may be. That is, the Company will make, without extra charge, any and all needed repairs to the roof and to any "flashings" (where the roof is built up against chimneys, vertical walls and the like) for the stated number of years, provided, of course, that these repairs are not made necessary by other than ordinary wear and tear of the elements.

The roofing contractor laying such a roof must hold a certificate of approval issued by The Paraffine Companies, Inc., as to the reliability of his work. Furthermore a periodical inspection of, and report on, the condition of the roof may be given without any additional expense to the owner. As a matter of fact, these roofs invariably far outlast the terms of the agreement.

How Pabco Ten-, Fifteen- and Twenty-Year Roofs are Constructed

These specification roofs may be described as consisting of two, or three, layers of Malthoid, Pabco or Durable Roofing cemented together with Floatine (a special bituminous cement) and

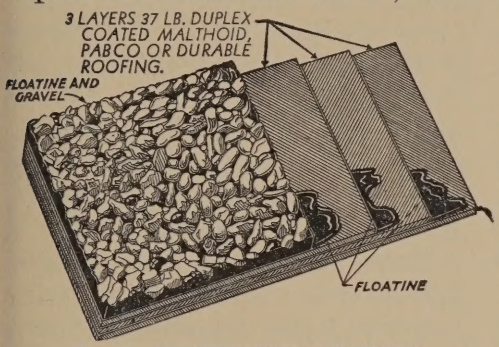

Fig. 16. CONSTRUCTION OF PABCO 20-YEAR ROOF.

finished with a durable surfacing of gravel, crushed brick or similar ornamental granular mineral material.

While a slope of about six inches rise per horizontal foot would seem to be indicated in this chapter as the maximum of steepness for such roofs, such is not actually the case. These Pabco roofs may be carried even vertically but with a somewhat modified construction.

Waterproofing Over Doors and Windows With Malthoid, Pabco and Durable

If flat roof areas occur on your home do not be deceived into the belief that it is easy to secure proper waterproofness in such places. Furthermore, remember that just to stop even a slight leak in such a situation may not only cost anywhere from ten to fifty dollars but in addition you may have to pay from fifty to two hundred dollars—possibly more—to repair interior finish ruined by the leak.

On the small areas over doorways or projecting windows or the like, where you will not wish to walk on the flat area except at occasional times, have not less than two layers of Light Malthoid, Pabco or Durable Roofing applied, cemented together, and flood-coated with Floatine, with gravel embedded in the Floatine coat. All edges should be flashed just as if the area were a large roof, and a proper outlet installed.

Remember water does not regard the size of the roof area—it will go through a leak on a roof deck of the size of a pocket handkerchief as readily as it will go through the same kind of a leak in the immense roof of a steamship dock.

Our best advice is that you should have an experienced roofer cover with the above described materials even the smallest flat area of the type here under discussion. Do not permit yourself to be persuaded that such areas can be protected by a metal sheet such as tin or galvanized iron. Such sheets will not stay tight because they are actually torn apart

by the expansion and contraction they undergo due to temperature differences—and the destruction is actively assisted by corrosion.

Galvanized iron is not safe for any roof work save the counter-flashings (which are actually out of the water wash on the roof) and, only in a limited degree, the outlets. These latter are small and not so seriously affected by expansion and contraction.

Pabco Protection for Sleeping Porch Roofs and Decks

When it comes to a larger deck on which you may desire to walk, or which you will use as a sleeping porch, but which is open to the weather, you are faced with a floor covering as well as a roofing problem.

The service required here is very much more severe than on a mere roof—slope is almost or quite absent, wear and abrasion may be extreme. This accounts for the frequent difficulties, expense, damage to rooms and contents of rooms below and all similar disappointments growing out of poorly designed roof treatments on such areas.

In the beginning it may be said that this booklet will recommend no definite treatment for sleeping porches and roof decks on which there will be walking.

However, a very carefully drawn specification calling for the cementing together of a plurality of layers of Malthoid, Pabco or Durable roofing and a strict observance of certain flashing directions has been developed after years of experience in roof decks of these characters in an extent of territory reaching from the Mexican to the Canadian lines as well as in many foreign lands with weather conditions ranging from the tropic to the arctic.

These specifications are available to your architect—he will prefer to follow them rather than leave the design of such deck waterproofing to one whose experience in the field, though perhaps quite uniformally successful, has been strictly local and not sufficiently wide to cover all of the principles involved.

Pabco coverings for sleeping porches and walking decks can be made in several textures and finishes. Under certain conditions an agreement is furnished to keep these Pabco porch and deck coverings in watertight condition for ten years without additional cost to the owner.

CHAPTER XII

Flooring

THE rough flooring (or under flooring) already mentioned in connection with the frame of your house has been laid on the floor joists and extends under the plates on which the studs are set.

This sub-flooring should be surfaced No. 1 Common Douglas Fir (except in those areas where other woods are considerably cheaper and can be obtained in good grades) and preferably should be "tongue-and-grooved."

This material should be repiled when received at the site and allowed to dry as much as possible before using, although usually quite a long period of time elapses between the laying of the sub-flooring and the completion of the floors, so that the sub-flooring has an opportunity to dry while nailed in place in the partly finished house.

Do not risk using unseasoned or low grade lumber to save a little money. The result of such false economy may easily be floors that squeak and bulge—and disheartening costs for later repairs. It is much easier and far more satisfactory to build well at the outset. Many owners of hastily built houses have been put to great expense and inconvenience by floors that did not stand up.

Sound Deadening with Pabco Deadening Felt

Another phase of good home construction that is very much worth while and too often neglected in cheap and hasty construction is insulation against sound transmission. Many home owners do not realize that it is possible to build houses in which unnecessary noise is almost entirely eliminated.

Pabco Deadening Felt used between all double floors and in partitions will make your home quiet and restful. For both floors and walls use one course of 1½ pound Pabco Deadening Felt as illustrated, and the result will be all that you desire.

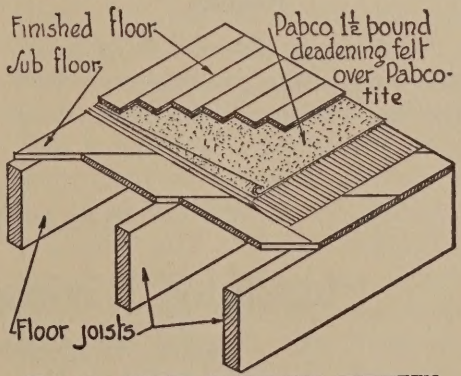

Fig. 17. SOUND DEADENING BETWEEN FLOORS—USING PABCO DEADENING FELT OVER PABCOTITE.

A pillow fight in an upstairs bedroom need not annoy others who are reading in the library

downstairs—and in the home in which Pabco Deadening Felt has been properly used such distractions cannot be heard throughout every room.

Finished Floors of Hardwood

After the sub-flooring has dried in place during the construction of the other features of your home the finished hardwood floors can be laid without danger from warping. Quarter sawed oak, in strips 2¼" wide and ⅞" thick is the best material for finished floors. Quarter sawing exposes the most attractive grain and gives a beautiful finishing surface as well as better resistance to wear. This flooring will be tongue-and-grooved and when in place the nailing marks will not be exposed.

Linoleum and Felt-Base Floors

The vogue for color in home decoration has greatly increased the use of colorful felt base floor coverings and linoleums throughout the home. In Pabco Floor Coverings, for example, there is a wide variety of patterns, from which may be chosen a design that will exactly harmonize with any scheme of decoration.

In rooms where linoleum is to be laid, the contractor may be instructed to omit the finished flooring, but in that case, an even, rigid tongue and groove sub-flooring should be provided. When the house is completed, the linoleum is cemented down over 1½ pound Pabco Deadening Felt which has been cemented to the sub-flooring. Before laying, care should be taken that the sub-flooring is entirely dry, clean, and free from all unevenness and projecting nails.

Pabco De Luxe Floor Covering is often preferred to linoleum in the kitchen and bath. Since it is less expensive, it is a simple matter to get variety and to keep up with changing trends in decoration by laying a new Pabco De Luxe pattern every few years.

CHAPTER XIII

Plumbing, Wiring, Hardware, Doors and Windows, Heating

THERE is a great temptation to write separate chapters on each of the subjects grouped in the title of this single chapter. The intention of this book, however, is to deal with those phases of home construction which have to do with the structural materials of the building or which may involve concealed defects or on

which it is probable information is not otherwise readily obtainable.

It is the intention, likewise, to avoid such subjects as the number and size of rooms, shape and arrangement of the house and its rooms and all other items—extremely important though they are—which must be determined by the owner in accordance with his individual needs and contemplated cost of the home. Plumbing and lighting fixtures and hardware become almost house furnishings in so far as they express the taste of the owner. It is obviously impossible to give adequate advice concerning them in a book of this character.

Almost the same situation applies to doors and windows. Rather than enter upon a discussion of these members of the house, variable as they may be in type, size, location and relation to other features, we believe it is best to commend the subject to the study and observation of the owner himself so that he may be prepared to express his preferences to his architect.

There are important and vital details to observe in the installation of wiring and the piping systems for water and gas. However, in the various incorporated cities these matters are covered by building codes which operate to give to the owner a safe and well installed system of wiring and piping which will not require material attention or maintenance expense during the probable life of the house. Where the house does not come under the jurisdiction of an effective building code, it is a simple matter to specify that the plumbing and wiring shall be installed exactly as though such a code applied.

Fig. 18. BUILT-IN KITCHEN VENTILATING FAN.

A discussion of house heating is also omitted from this booklet. The subject is a large one and, more than any other, is influenced by local conditions of climate, available fuel and the habits of the occupants of the house. Here again a close study of local conditions is advised. In those localities where gas is available complete information may be obtained from the public utility corporation supplying gas to the community.

CHAPTER XIV

Exterior Finish

THE exterior of the frame home may be finished either in stucco, shiplap or rustic, shingles, brick veneer, or rough boarding applied either horizontally or vertically.

Combinations of these finishes may be used—stucco may be used with rough boarding, brick veneer with stucco, shiplap with shingles — any number of attractive combinations, each appropriate to certain types of homes.

Other types of exterior finish are used, but to a smaller extent, such as solid brick and other masonry, stone, adobe, etc. Of all finishes, however, stucco, brick veneer and various forms of wood siding have become most used in temperate climates.

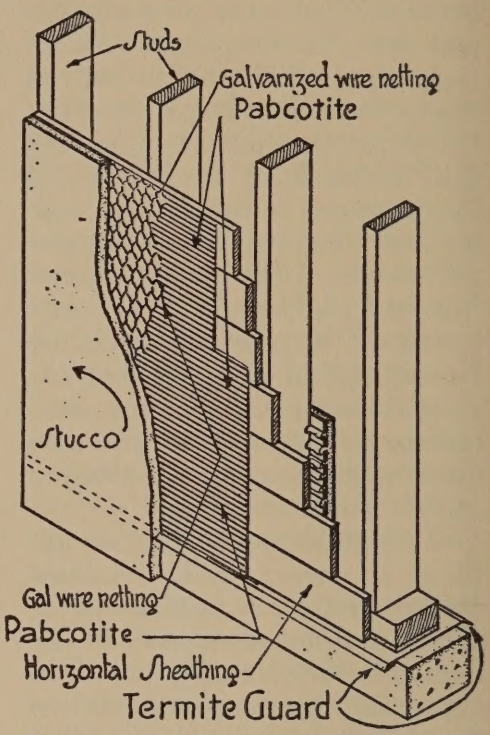

Fig. 19. APPLICATION OF PABCOTITE UNDER STUCCO OR OTHER OUTSIDE FINISH.

Stucco Finish

As an example of methods used in applying the exterior finish, we will describe the use of stucco in some detail.

Over the Pabcotite—the application of which was described in Chapter X—wire lath or poultry netting dipped in a galvanizing bath before and after weaving is applied.

This wire should be fastened to the building over furring devices spaced eight inches each way. At all corners of the building a supplementary strip of wire twelve inches wide should be applied to prevent cracking of the plaster at these corners.

Over this wire, the required coats of plaster and stucco are then applied successively. The first plaster coat is well pressed in and should be built up above the wire reinforcement. The outer surface of the Pabcotite House Lining affords a perfect bond for the plaster. The plaster surface is "scratched" to make a bond for the second or leveling coat.

The final coat usually consists of prepared stucco containing a

mineral color of the shade desired by the owner. This final coat may be applied in a variety of textures such as "pebble dash," smooth, or rough troweled rubbed with burlap.

The stucco manufacturers will furnish small samples of their stucco, showing both color and finish. From these the desired selection may be made.

Extra Precautions Around Windows

Before the stucco is applied an inspection of all casings and sills should be made to see that the stucco will not under any circumstances touch the unpainted wood.

Pabcotite should be applied so that it extends out far enough to make contact with all casings. Wherever necessary, supplementary strips of house-lining should be tacked in place to keep the plaster from contact with the wood and extra Pabco Multi-Service Paint applied where necessary.

Extra precautions here, even to the point of nailing the house-lining to the casing and coating the nails with P & B Paint will be effective not only in the prevention of staining on the stucco but will materially assist in cutting off drafts of cold moist air which may find their way around the window frames and thence into the house. Furthermore, such precautions will tend to prevent ingress of termites and other insects.

Preventing Stains Around Exterior Woodwork

Unless special precautions are taken a staining may occur at the corners of window casings or sills and at other places where water runs over woodwork and then out on the surface of the stucco.

This staining may be prevented by thoroughly painting the tops and side edges of all casings and the ends and bottoms of all window sills with Pabco Multi-Service Paint, properly thinned, using two coats.

It is not sufficient to prime these parts of the casings and sills with mere "lead and oil." If lead and oil were sufficient to prevent the attack of the alkali in the stucco and plaster on the wood, then lead and oil would be the solution of all problems having to do with stucco painting.

Painting Stucco

It is unquestionably true that on houses which have been built for some time the stucco may become stained. It is possible also that the owner may tire of the particular color of the stucco on his home. In either of these cases recourse must be had to a paint coat, and much dissatisfaction has been experienced in the past from the use of improperly compounded paints. Stucco is strongly alkaline and the alkali will react with either the oils or the pigments (or both) of certain types of paint and cause discolorations to appear.

Pabco Multi-Service Paint Ideal for Stucco

Certain oils and gums are resistant to alkali attack, and a great deal of experimental work has been done by The Paraffine Companies, Inc., to combine these components into a paint which will resist the long continued alkali attack of stucco, cement plasters and similar surfacing materials.

This research work finally achieved the desired result. Pabco Multi-Service Paint is recommended for this particularly difficult type of exterior painting and may be used without fear of unsightly burning, checking, peeling, or excessive chalking.

Brick Veneer

Brick veneer is a descriptive term covering the application of brick to the outside of a frame building as the final finish.

On the whole, brick is a very satisfactory building material to employ for the reason that almost any type of brick presents a dignified appearance and is in good taste.

There are many types of brick available, of course, and each of them may be laid with black or white mortar joints—or even red, blue or green mortar joints. As a result, many very interesting and highly decorative effects can be reproduced.

In addition to the almost limitless subject of the different colors, shapes and textures of bricks, there is also the equally important subject of laying to be considered. The bond—resulting in the "pattern" showing on the finished wall—is a fascinating subject for study; the effects achieved through the selection of the proper bond will be a rich reward for whoever investigates. As a matter of fact, first-class bricklayers are so well trained in their trade that they can produce whatever effects you may desire.

Your architect probably will have illustrated books which you may study or you may obtain articles on the subject from your local library. Since brick is one of the oldest building materials in the world and has entered into the construction of some of the world's most magnificent edifices, it is well written up in the literature of building.

A popular and effective type of brick work at the present time, and one which is relatively inexpensive, is obtained by the use of common bricks which have been used and so still have a considerable amount of mortar clinging to them from their previous setting. These are laid in the wall somewhat irregularly and a certain amount of mortar is purposely allowed to be smeared over the surface. This gives a very real imitation of what may be termed peasant craftsmanship.

It has been found additionally that the beauty of this type of brick work may be enhanced immensely, the colors materially

softened and an appearance of age given by coating the entire finished brick work with a colored cement stucco wash. When this is thoroughly dry nearly all of the stucco wash may be cleaned off by means of a wire brush or even by acid—the latter being a process with which any bricklayer is familiar.

Tying Brick Veneer to the Frame

In applying brick as a veneer to a frame buiding it is necessary to tie the brick work to the framework of the structure. This is sometimes done by driving spikes into the sheathed building, which enables the mortar of the brick work to obtain a hold on the wall. Needless to say, the Pabcotite House Lining should be carried down behind the brick veneer in the same manner as over the rest of the building.

Woods for Exterior Finish

There are but few variations in methods when woods such as rustic or shiplap, rough lumber or shingles are utilized. The individual taste of the owner will have to govern very strongly when such an exterior finish is used, or the lumber most easily and cheaply obtained in any community may have much to do with the question.

The architect who designs the home may present examples of a particular type of wood finish, or he may illustrate specific subjects by photographs. Such ways give a far better idea of the possibilities of wood finish than may be obtained from pages of description.

CHAPTER XV

Interior Walls and Ceilings

WHEN the sheathing was nailed to the outside of the studding one side of the dead air space in the walls was provided. When the interior wall finish is applied to the inside of the studding the dead air space is completely closed off. Within this space are the pipes and wires of your gas, plumbing and electrical systems. To correct errors or make changes after interior walls are finished is a difficult and often expensive proposition, and the need for careful and complete advance planning is apparent.

Wood Lath

Wood lath makes a satisfactory plaster base if properly used. Only good quality lath, easy to work, and light in color to prevent the possibility of the laths showing through after the interior is finished, should be selected. Each lath must be nailed to each stud, and since the studs will be on sixteen-inch centers and a lath is

forty-eight inches long, one lath will reach four studs.

Laths should not be butted tightly at the end joints and the joints should be "staggered" every sixth or eighth lath on walls, and every fifth lath on ceilings. The use of metal corner bead at outside corners is recommended. At these places bumps from furniture or other accidents would do the severest damage. At "inside corners" a wire reinforcement of the plaster will prevent unsightly cracking.

Steel Lath

Steel lath is another material affording a good base for plaster. It is higher in cost than wood lath but, being manufactured in sheets, can be nailed to the studs more quickly and with fewer nails than in the case of wood lath.

Plaster Lath

Plaster lath, which has the appearance of plaster board or wall board, is an effective base for plastering. Its surface has indentations into which the plaster penetrates, keys and "bonds."

This product is manufactured in large sheets and the labor required to install it is much less than that required by wood lath.

Plaster lath is fire resistant, and a sound deadener. It also provides an additional barrier against the passing of heat and cold through the walls. In addition, it makes possible a well about double the thickness in plaster of the ordinary wall. Naturally, too, less plaster is required to cover plaster lath.

Plastering

Plastered walls constitute another "danger spot" — a place where cheap and flimsy construction is possible without being apparent to the untrained eye.

Consequently it is important that owner, architect and contractor work together in making certain that the best quality of plaster is used and that the plaster coat is of adequate thickness.

There are many variations in finish, of course, that can be obtained. The desired finish can be determined from samples which the plasterer will furnish.

For kitchens, bathrooms, etc., furthermore, there are special cements available which are washable and may be marked off into squares to simulate the appearance of tile.

Be sure that you escape the evils resulting from a poor plastering job. A good job is a matter of the correct use of the right materials and of obtaining the highest grade workmanship.

Gypsum Plaster Wall Board

Gypsum plaster wall board used for inside walls creates pleasing interiors without the use of plaster. It has four outstanding protective features—it is fire resistant, it is a sound deadener, and it resists both heat and cold. In building a new home it is well

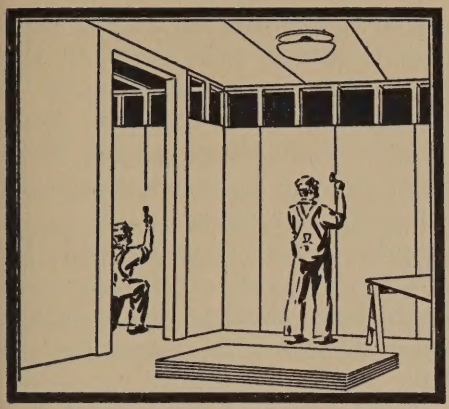

Fig. 20. APPLICATION OF GYPSUM PLASTER WALL BOARD.

to consider these four features, for it is essential that every home be properly insulated.

Gypsum plaster board comes in thicknesses of ¼-inch and ⅜-inch, in four-foot widths, and in lengths from five feet to twelve feet. It may be placed right on the studs in lieu of lath and plaster and decorated so that it will give the effect of a plastered or stucco wall.

To make a one-piece wall, place the edges of the boards close together leaving a space of approximately ¼-inch — the space must come over the stud. Fill the joint with joint sealer made especially for this purpose, and allow to dry. Then go over the joint with sand paper to smooth down the joint and to bring it even with the face of the board. This method of erecting gypsum plaster board walls produces the solid one-piece wall effect.

The most desirable finish on gypsum plaster wall board is one of the following: For a rough surface, use Pabco Ruff-Cote of the 600 series; for a smoother finish use the 4150 series of Pabco Improved Interior Finishes. Each of these may be had in many colors. All of the finishes recommended should be applied in two coats.

CHAPTER XVI

Painting and Decorating

AT this stage in the construction of your home, but little remains to be done. Your architect will have planned for the laundry chute, locks for all outside doors (it is a good plan to have a single key fit all outside doors), the extra closet space, the built-in features that your needs dictated; and your new house will be *home* not only in name but in reality. It is ready now for decoration, both inside and out.

Color Harmony Essential in Home Decoration

Here we reach a point where every individual case is truly different from all others; here is where individuality is given opportunity to express itself; here

the ideas of various individuals may differ. Regardless of such differences in taste, however, there are basic color harmonies which must be followed in order to have every room—and the exterior of the house—correct in color as well as design.

Naturally, the color harmonies in vogue today have made certain colors in decorative finishes especially popular but this has not been to the exclusion of those older colors which were basically right and which are essential for the more conservative treatments. The Paraffine Companies, Inc., has made an exhaustive study of the changing trends in decoration with the result that Pabco Paints, Lacquers and Enamels may be had in the correct colors to harmonize with the character of decorative treatment which the owner most desires.

It is an accepted fact that the colors and surroundings of our daily life have influence on our health and happiness. True or not it is certain that some homes seem more placid and restful than others—and it is not difficult to believe that color, cleanliness, texture and freshness of the painted areas have something to do with the formation of these impressions.

Renewing Homes With Pabco Paints, Enamels and Lacquers

It is in order here to speak of houses which are not built for the owner, but which have been purchased either new or after the house has been occupied by a former resident. If you have bought your home it may have been painted in colors which do not suit your fancy or the paint may be weathered or marred. In other words your first desire will be to have changes made in the color scheme of the house and to have it "freshened up."

This desire to keep the home "freshened up," applies to interior furnishings, too. The woman of the home is no longer content to live with furniture of the same color throughout a generation. Among other things she is interested in having certain pieces of painted furniture, ornamental pieces, etc., recolored occasionally. More and more, frequent repainting of the interiors of homes, represents an ideal that is not a dream of the future but an actuality of today.

As a result, all that is said here about painting may be taken to apply either to the house which has been built especially for you or to the house which you have purchased.

Newer Methods in Painting

It has long been the custom for the painter to bring his materials to the house and to mix his own paint "on the job." There is no objection to such a practice; generally speaking in this day, good lead, zinc, oils and varnishes are readily obtainable and painters

are sincerely attempting to use the best available.

The custom of the painter "mixing his own," however, is now rapidly passing away. In its essence the custom is not an economical one because large paint factories can mix a thousand gallons of paint with practically no greater expenditure of labor than the painter himself will put forth in mixing a single gallon. The paint manufacturer utilizes electric power to stir the paint ingredients whereas the painter must use hand-power; and hand-power is probably ten times as expensive as electrical power.

Beyond all of this, however, is the fact that paints made in large quantities under the most careful laboratory control must be more uniform in composition and generally of better quality than the product of hand mixing and testing by "the feel of the brush."

This, however, is only the beginning of the story dealing with the manufacturers' contributions to home decoration and comfort. Within the last half decade there have come forward materials for adorning the home which cannot be handled by hand-mixing nor tested by the judgment of even the most skilled workman. The technic of the use of lacquer solvents and the complex procedures necessary in the heat treating of oils designed for specific paint purposes have made it just as essential that paint and lacquers shall be manufactured in a form ready, or substantially ready, for application as it is that the great passenger airplanes shall be built by skilled manufacturers and not by the pilots trained to fly them.

Pabco Paints, Varnishes, Enamels and Lacquers

The introduction of Pabco Multi-Service Paint, Varnish, Enamel, Floor Enamel — and Pabco Improved Interior Finish have made the one-time problem of proper materials to finish and refinish the modern home, an easy one to solve. Whether applied by novice or master painter, these materials have shown themselves, in ease of application, beauty of color and texture, and durability,

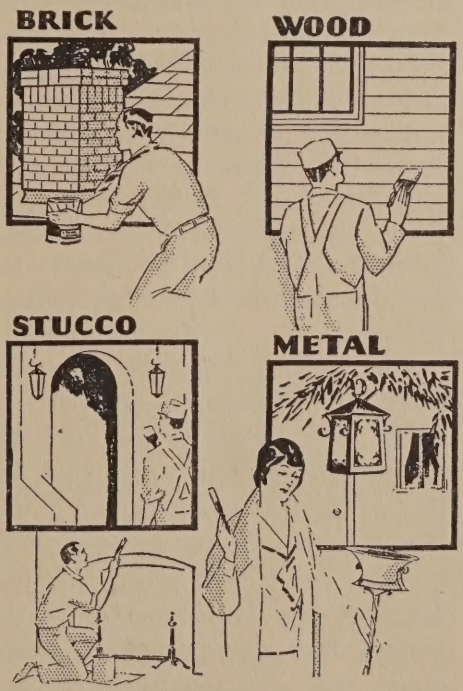

Fig. 21. VERSATILITY OF PABCO MULTI-SERVICE PAINT

to be not only an important factor in saving of time, money and effort but a solution to the numerous perplexities that always beset the home owner in choosing or applying materials that will insure satisfaction and enduring service.

In offering these materials for general painting needs, The Paraffine Companies, Inc., feels confident that it can aid the homeowner materially by offering a unique line that is revolutionizing in its make-up.

Pabco Multi-Service Paint and Varnish offer two decided advantages that more or less are linked together. Through specially developed formulas their vehicles are designed to adhere to any surface, either on exterior or interiors. Secondly, they are guaranteed to be of highest quality, yet sell at a price materially lower than other paints or varnishes of high standard. Because of this your contractor is able to reduce greatly the cost of materials to you through the favorable Pabco prices.

For the specialized interior work on ceilings, floors, woodwork, etc., we are inclined to recommend a paint finish such as that of the Pabco Improved Interior Finish—giving an egg-shell texture—or Pabco Multi-Service Enamel. It should not be overlooked, however, that Pabco lacquers will give coatings of the same textures, in the same colors and with a much shorter drying time. This favors their use where saving of time is essential.

For the woodwork and floors, hard, durable enamels, such as Pabco Multi-Service Enamel and Floor Enamel are to be preferred, especially since they dry, dust free, in from 4 to 5 hours.

Undercoat for Interior Woodwork

You will probably be interested in knowing just what paints, enamels or lacquers to use in order to secure the results which should characterize the Pabco Protected House. The entire effort of the makers of Pabco Paints has been to simplify rather than complicate the use of these paints for domestic purposes. For all interior woodwork the priming coat and the following coat may be applied with a single paint, No. 600 Pabco Undercoat. Directions for the use of this paint in each of the several coats are printed on the container.

Interior Woodwork

The finishing coats of the woodwork should either be in gloss or "eggshell" (semigloss) enamel. Pabco Multi-Service Enamel is particularly well designed to work with Multi-Service Enamel undercoater in that both have essentially the same composition but differ in that the enamel has a gloss finish while the undercoater is "flat." Pabco

Improved Interior Finish will produce a beautiful eggshell enameled finish.

Finishing Interior Floors

There are three distinct types of floor finishes, each possessing certain advantages: (1) Varnish, (2) Enamel, (3) Lacquer.

Varnish is invariably selected for hardwood floors because of its ability to show the natural grain in the wood, its durability and the fact that it will not chip or scratch white as does shellac. Pabco Clear Multi-Service Varnish, containing high-grade gums, produces a hard, long-wearing surface of a smooth, even texture.

Pabco Multi-Service Floor Enamel is the latest development in modern materials, combining drying speed with extreme durability. It gives a tough, waterproof, glossy enamel finish to all surfaces. It may be washed and is designed to resist the action of the caustics and chemicals used in the average floor cleaning compound. Multi-Service Floor Enamel is also recommended for exterior surfaces such as porches, decks, cement steps, etc.

One of the chief advantages in using lacquer on floors is the rapid drying properties which it possesses, making floors ready for almost immediate use after application. Lacquer is the most durable of all interior finishes and can be washed and cleaned with ease. As compared with varnishes and enamels the texture is not as glossy but presents rather an opaque finish.

Finishing Plastered Walls

Plastered walls may be finished with Pabco Improved Interior Finish which gives a beautiful permanent, semigloss, even texture to the walls and a finish that will not collect dirt. It is quickly washed with soap and water and repeated cleaning has no harmful effect on the surface. The colors are fast and do not fade from interior exposure nor do kitchen fumes disintegrate them.

Painting Exposed Metal

The exterior of the house likewise calls for a considerable amount of paint, and exposed metal work probably should be considered first. On all metal surfaces, no matter what their composition may be, a first coat of Pabco Red Lead Primer is recommended. This makes a hard, cement-like film next to the metal. Red lead has a peculiar property, technically known as "inhibitive power," of preventing rust forming on iron and steel. There are other pigments which actually encourage the formation of rust, and these, obviously, should never be used next to the metal. There is another advantage attached to the use of this paint as a first coat. It becomes increasingly hard and cement-like with the passage of time, but does not flake off.

Any desired shade of Pabco

Multi-Service Paint may be next applied over the metal work primed with the red lead. It is possible that two coats of Pabco Multi-Service Paint may have to be used over the red lead particularly if the desired finish is to be comparatively light in color.

Finishing Exterior Woodwork

For woodwork of all kinds on the exterior of the house, Pabco Multi-Service Paint is recommended. On new unprotected woodwork three coats are recommended for best results. The exact directions furnished on the can should be followed in applying the paint.

It is not wise for the contractor or painter to use a priming mixture of "lead and oil," which he may mix up for the purpose. While "lead and oil" have long been used for priming woodwork, being mixed for the purpose at the time of use, the result of using them has not always been perfectly satisfactory. Possibly this has been due to the fact that frequently a soft gummy mixture has resulted and this as a primer has left a soft coat beneath a hard top coat, and "alligatoring" of the type described in the next column has resulted. Or at the extreme, improper priming, particularly on woodwork, may result in the peeling of the outer coat of paint away from the lower coats.

By using the same paint properly adjusted for priming, first coat and top coat, all of this inequality and lack of uniformity may be avoided — the several paint coats will not "fight" among themselves. An exception is to be noted in the case of priming window frames and sills where exterior plaster finish touches them—this has been explained under "Exterior Finishing."

How to Prevent Paint Cracks

Possibly you have noticed on structures that paint sometimes breaks into irregular areas; this action is known as "alligatoring,"

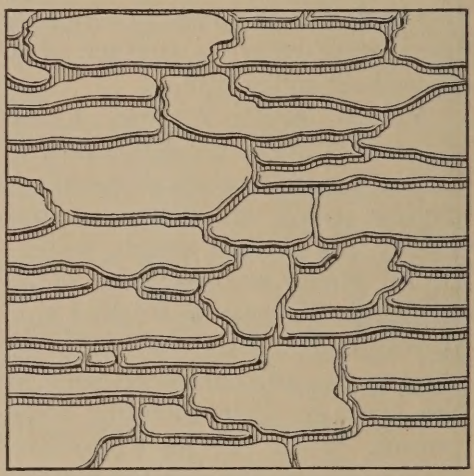

Fig. 22. APPEARANCE OF "ALLIGATORED" PAINT SURFACE.

a term which aptly describes it, as the paint coat takes on a resemblance to an alligator skin. Generally speaking this has been caused by the fact that the first coat or coats of paint were comparatively soft and a harder coat of paint was applied as a finish. The harder coat of paint could actually move and draw itself to-

gether in small separated areas by sliding on the softer paint below. Out of observation of this fault has grown up the knowledge that the undercoats of paint should be harder than those above; this is but one of the many details (but one having to do with a very troublesome result) which have to be solved in the manufacture and application of successful paints.

CHAPTER XVII

The Pabco Budget-Payment Plan

ALTHOUGH the Pabco Budget-Payment Plan is by no means intended for financing the erection of a complete house (this subject is covered in Chapter V), the Plan is available as a service that makes it possible for you to budget the cost of any later miscellaneous changes or improvements you may wish to make in your home.

After your home has been built and you have settled yourself therein, you may decide to erect a few partitions in the basement, to install additional shelving, to add a few cupboards for kiddies' playthings, to redecorate odds and ends of furniture so that they will be in harmony with the new home—any one of a number of things you will feel impelled to do to make your new house a "home" in every sense of the word.

Very likely you will wish to do much of this work yourself—there's a thrill to it—but nevertheless all these things require materials . . . lumber, Pabco Wall Board, light hardware, tools, Pabco Multi-Service Paints, Enamels or Varnishes, etc.

However, to make these improvements requires no large immediate outlay of money. You can purchase them all—at one time or at intervals—through your nearest Pabco dealer, making use of the Pabco Budget-Payment Plan. Only a small payment will be required at the time of purchase while the balance may be disposed of in small monthly payments over a period of one year.

In passing it may be said that this plan is offered through authorized Pabco dealers by the Residential Finance Company, a subsidiary of The Paraffine Companies, Inc., being offered by an organization sponsored by a manufacturer, it offers you the convenience of budget payments with no intention of profiting thereby excepting through your good-will.

CHAPTER XVIII

Conclusion

THE reader of this booklet has acquired much specific and valuable information regarding the building of better homes, of methods and materials that eliminate the "danger points" in construction. There are, of course, many subjects that it has been impossible to cover within the scope of a book of this kind.

Volumes have been written treating of almost every phase of building construction. A selected list of such books will be gladly furnished.

Our Free Advisory Service, which includes the advice and suggestions of our construction experts, is always available to you.

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